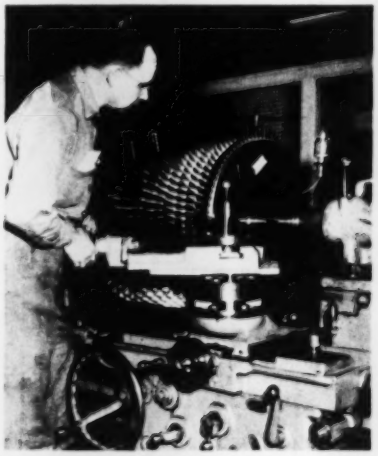
MARCH 31, 1952

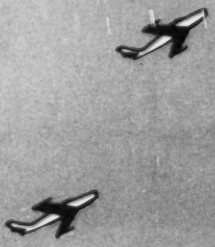
STEEL

THE WEEKLY MAGAZINE OF METALWORKING

arker Appliance: Cooling Valves

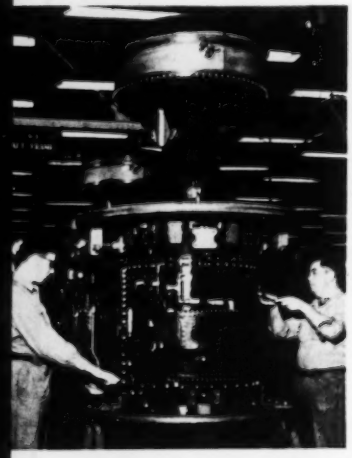


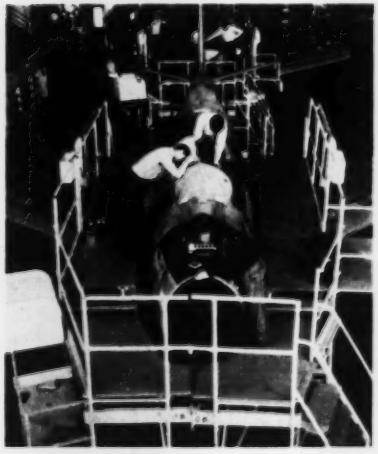
Thompson Products: Rotor Seals



eneral Electric: J-47 Jet Engines

North American: F-86 Sabrejet





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New Life for Worn Parts

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50 years of creative engineering
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CONTINUOUS BUTT WELD PIPE MILLS
DRAWBENCHES FOR FERROUS AND NON-FERROUS BARS AND TUBES
REDUCING MILLS · SIZING MILLS · LEVELLERS
CONTINUOUS CUTTING LINES · REELERS
SLITTING LINES · SHEAR LINES
WIRE DRAWING EQUIPMENT
ASSOCIATED COMPANIES
Head Wrightson Machine Company, Ltd., Middlesbrough, England — Great Britain, Finland, Sweden, Norway, Denmark, Union of South Africa, Northern and Southern Rhodesia.
Aetna-Standard Engineering Company, Ltd., Toronto, Ontario, Canada.
M. Castellvi, Inc., New York, N. Y. — Mexico, Central and South America.
Societe de Constructions de Monthard, Paris, France — France, Belgium, Holland, Luxembourg, Switzerland.
Demag Aktiengesellschaft, Duisburg, Germany — Germany, Austria, Yugoslavia, Greece, Turkey, Egypt.
Compagnia Italiana Forme Acciaio, Milano, Italy — Italy.
Aetna-Japan Company, Ltd., Tokyo, Japan — Japan.
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THE AETNA-STANDARD ENGINEERING COMPANY • PITTSBURGH, PA.
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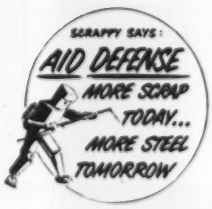
Grandpa Never Threw a Thing Away



It's only human to want to hold on to things after they've outlived their usefulness. That's why today millions of tons of worn-out and obsolete equipment and machinery are lying forgotten in the country's plants and factories and on farms.

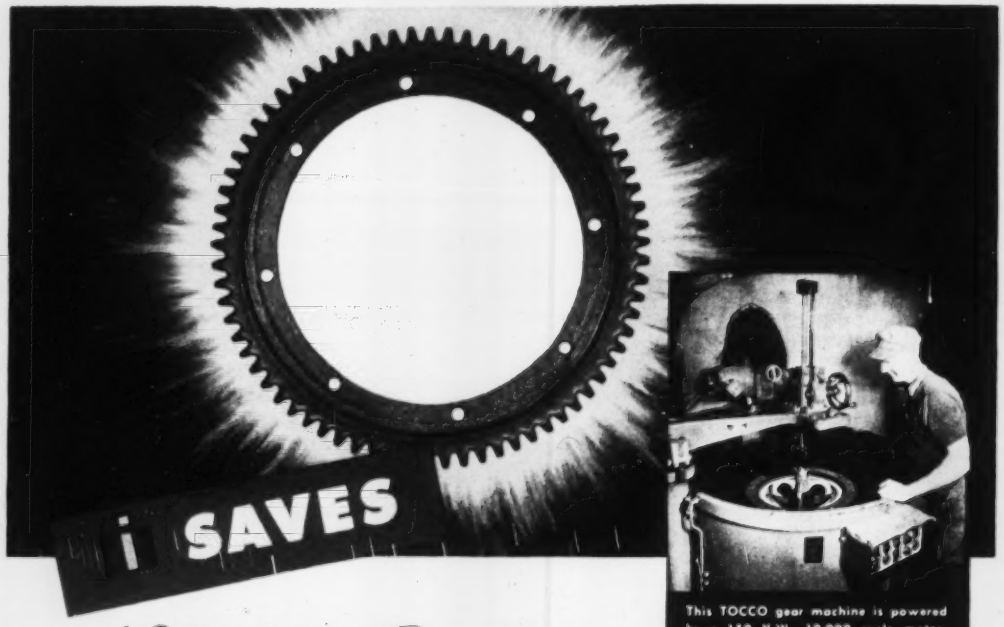
The steel industry needs these millions of tons of dormant scrap, needs it in the worst way. With this vital dormant scrap the entire steel supply picture would brighten up, with more steel for everybody. But without it, the steel industry cannot hope to keep up production at present levels.

Call in a scrap dealer now, today. He will buy your dormant scrap and start it moving toward the steel mills.

BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

More Scrap Today... More Steel Tomorrow



This TOCCO gear machine is powered by a 150 K.W., 10,000 cycle motor-generator set. Photo—courtesy of International Harvester Company.

$82,507 Per Year

with TOCCO* Induction Hardening

GEARS, shafts, pins, wheels, tubes and bars—almost any size or shape of part—or any metal, too—is adaptable to TOCCO hardening, brazing, annealing or heating for forging.

PRODUCTION UP—Engineers at the Milwaukee Works of International Harvester Company have adopted TOCCO for hardening final drive gears for famous International Harvester farm tractors. TOCCO increases production on the gear shown here from 14 to 35 per hour, 250% faster than conventional heating method, reduces job from a 3 shift to 2 shift operation, even with increased production schedule. Heating time is 35 seconds; oil quench, 60 seconds.

COSTS DOWN—TOCCO cuts cost—saves $82,507 per year on application shown above. TOCCO makes possible use of C-1050 A.R.R. steel instead of expensive A-8645-H alloy steel previously required. TOCCO also eliminates shot-blast, formerly needed to remove scale, and extra machining operations that used to be necessary to compensate for distortion.

Gear shown is 18½" O.D., width of face is 2", weight 34 pounds, 73 teeth. Hardness obtained is 55-66 R.C., using 140 K.W. of 10,000 cycle power.

●

Our Engineers can probably find applications in your plant where TOCCO can increase output and reduce unit costs.

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Mail Coupon Today

NEW **FREE** BULLETIN

THE OHIO CRANKSHAFT CO.
Dept. S-3, Cleveland 1, Ohio

Please send copy of "Typical Results of TOCCO Induction Heating for Forming and Forging".

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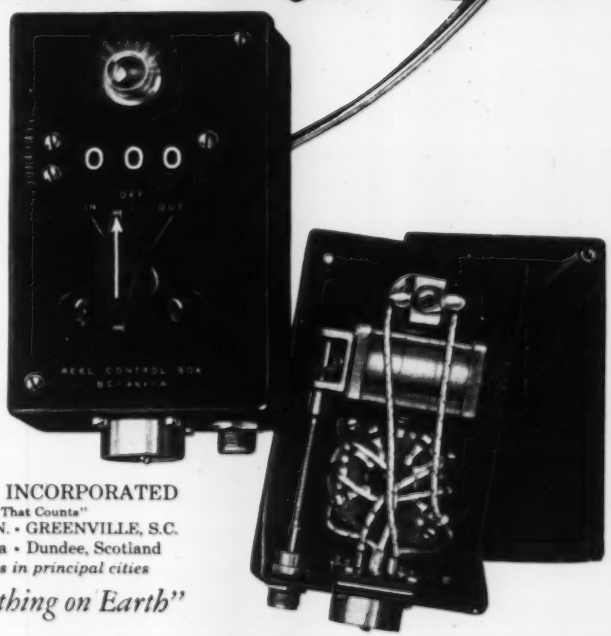
Small Component... or Complete Unit... You* can count on getting whatever You* need—

Added Evidence that—

Everyone Can Count on VEEDER-ROOT

This REEL CONTROL BOX, complete with its *built-in* counting mechanism, indicates the number of feet of antenna reeled in and out of certain types of military aircraft. Manufactured completely by Veeder-Root, including outside bakelite cover and box, this unit shows another imaginative application of the universal language of direct-reading *Count*rol.

Now if you, *in any of your defense work,** have a counting problem, then you can count on Veeder-Root to help you in every possible way.



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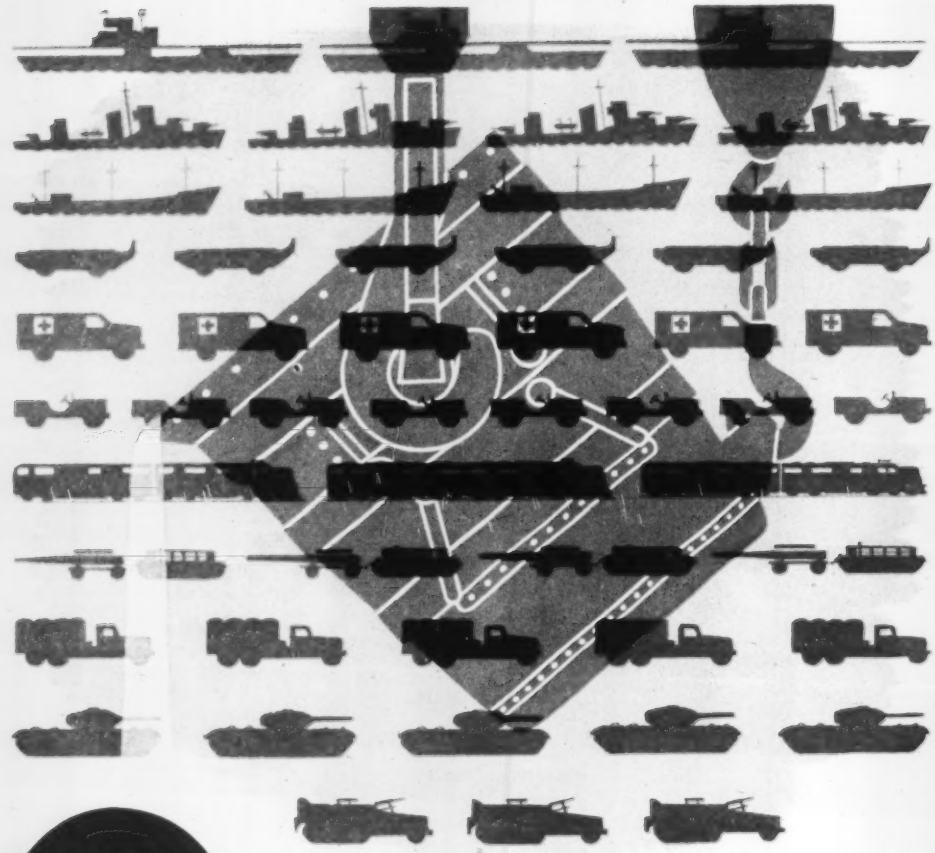
"Counts Everything on Earth"



AN ARMY MOVES ON ITS METAL!

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PRODUCTS & CHEMICAL
Corporation
NASHVILLE, TENNESSEE

PRODUCERS OF: FUELS • METALLURGICAL PRODUCTS • TENSULATE BUILDING PRODUCTS • AROMATIC CHEMICALS • WOOD CHEMICALS • AGRICULTURAL CHEMICALS

In these days of mechanized warfare, the most needed materials are ferrous metals and alloys. Transportation and communications equipment as well as weapons require iron and steel in huge quantities and that's where Tennessee comes in. Ferro alloys from Tennessee are used in the production of iron and steel in large quantities. Pig iron from Tennessee goes into castings for innumerable essential uses.

The thousands of vital defense products made every day take up the major portion of our present production. We are helping the defense program in many ways and the people here are proud of it!

This Week in Metalworking

STEEL

Vol. 130 No. 13 March 31, 1952

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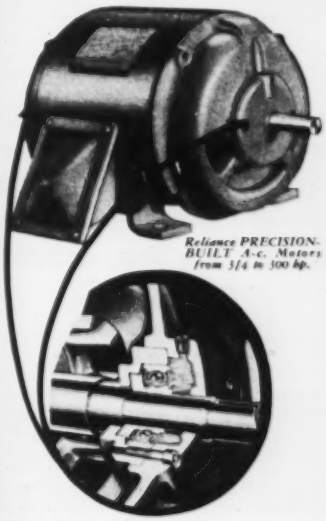
Pre-lubricated Bearing Design
in
RELIANCE MOTORS
provides
more operating hours without re-lubrication!



Reliance PRECISION-BUILT A-c. Motors from 1/4 to 100 hp.

Reliance Bearing Design, including extra-large grease reservoir, provides longer bearing life.

Original, factory lubrication permits more operating hours without re-lubrication than that of any other pre-lubricated bearing. From a larger grease reservoir than provided with any standard bearing, Reliance double-shielded bearings automatically take on new grease as needed. And the Reliance design not only *keeps* bearings lubricated, but makes it *impossible to overgrease* a Reliance Motor. Get the convenient chart on which you can check these and other features which combine to give you 15 important advantages in the Reliance Pre-lubricated Bearing Design . . . write today for Bulletin B-2201.

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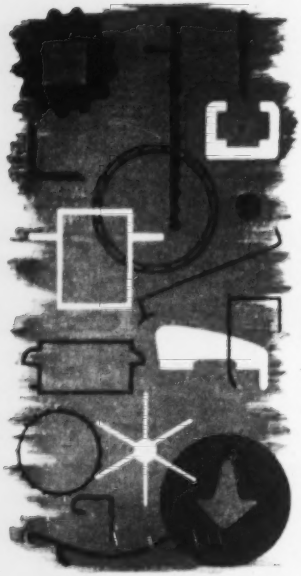
"All Motors are NOT Alike"



A profile of WERNER Aluminum Services

To the prime contractor who needs help *now*, Werner's extensive manufacturing and production facilities invite careful investigation as your dependable production source.

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Brass • Zinc • Copper

Your inquiry will bring you specific information concerning Werner facilities for: Extrusion and Roll-forming and, *secondary operations*: Bending • Drilling • Punching • Cutting • Counter Sinking • Welding • Riveting • Fabrication. **FOR ESTIMATING**: *Please submit drawings and specifications.*

* Names on request

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Behind the Scenes...

Changes

Two editorial personnel changes are occurring on STEEL's staff. Effective next June 1, Sam Baker will be transferred from the home office in Cleveland to New York as an associate editor. He'll help provide more extensive editorial coverage in the East and will relieve the mounting pressure of editorial work being carried by Eastern Editor Ben Price and Associate Editor L. E. Browne. Sam joined STEEL's sister publication, *New Equipment Digest*, in April, 1949, and transferred to this magazine in February, 1951.

The second change involves Floyd G. Lawrence who became a new assistant editor this month. He'll concentrate on news activities. Floyd attended Antioch College and later at Western Reserve University won a B. A. degree in 1950. He received his M. A. degree from Ohio State this month.

Speed

We were down at General Electric Co.'s Lockland, O., jet engine plant a while back and got convincing proof of the speed of jet planes. Along with several hundred other people, we went outside the plant to see a jet in action. A loudspeaker system had been set up and a voice informed us that the plane would soon be taking off from Wright Field in Dayton, O. We groaned because the weather was cold and it had taken us nearly 30 minutes to come by commercial airline from the Dayton Airport to the Greater Cincinnati field.

In a minute or two, the loudspeaker announced: "We have just contacted Wright and the jet plane is taking off now. It will be here in five minutes."

It was.

Request

We are in receipt of this letter from a gentleman who gives his name and address as Rev. Michael O'Connell, Rescue Mission, 1030 N. Wells St., Chicago:

Dear Friend:

Perhaps you have heard of me and my nationwide campaign in the cause of temperance. Each year for the past 14 years, I have made a tour of the Midwest and delivered a series of lectures on the evil of drinking.

On these tours, I have been accompanied by my young friend and assistant, Herman Forsythe. Herman is a pathetic case, a young man of a good family and excellent background, whose life was ruined because of excessive indulgence in whiskey, gin and rum, not to mention beer. How much better it would have been had he turned to the Lord.

Herman would appear with me at the lectures and sit on the platform, drooling at the mouth, and staring at the audience through blearing, bloodshot eyes, while I would point him out as an example of what drink would do.

Last summer unfortunately, poor Herman died. A mutual friend has given me your name, and I wonder if you would care to accompany me on my summer tour and take poor Herman's place.

Puzzle Corner

The puzzle of two weeks ago about the identity of the train engineer has brought forth a comment by Pat Dwyer Sr., one of the editors of *Foundry*, another Penton Publication. He writes a column in that magazine which occasionally runs a puzzle, and he informs us that the train problem originally graced his pages in 1932, just two decades ago.

As far as he knows, the puzzle was originated even earlier than that by some Bethlehem Steel Co. men who used it as an informal I. Q. test for job applicants.

First in with answers to the train problem this time were Harry Rupp of Service Iron & Steel Co., L. D. Rice of Timken Roller Bearing Co. and Robert W. Huff of Canton, O. Smith was the engineer. Presumably all three of those gentlemen with correct answers could qualify for a job with Bethlehem.

We have another Jones-Smith problem this week. Al Jones starts out at noon to walk from Allwood to Belleville. Ben Smith starts at 2 p. m. to walk from Belleville to Allwood. They meet at 4:05 p. m. Each reached his destination at exactly the same time. At what time did they arrive?

Shrdlu

(Metalworking Outlook Page 37)

STAINLESS STEEL FOR SUBSTITUTIONS

If your production is threatened by the short supply of critical materials—stainless steel may be your answer. Several types of stainless steel are in good supply, and are competitive in price with other materials. Latest N. P. A. directives have made certain types of stainless steels obtainable without restrictions.

Our engineering department will be glad to consult with you to see if you can fabricate stainless with your existing tools. You may choose to save money by using lighter gauge material and take advantage of the superior strength of stainless.

For complete technical information and advice, contact the Sharon district office nearest you, or write direct to Sharon Steel Corporation, Sharon, Pennsylvania.

SHARONSTEEL

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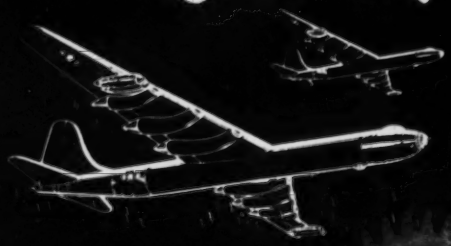
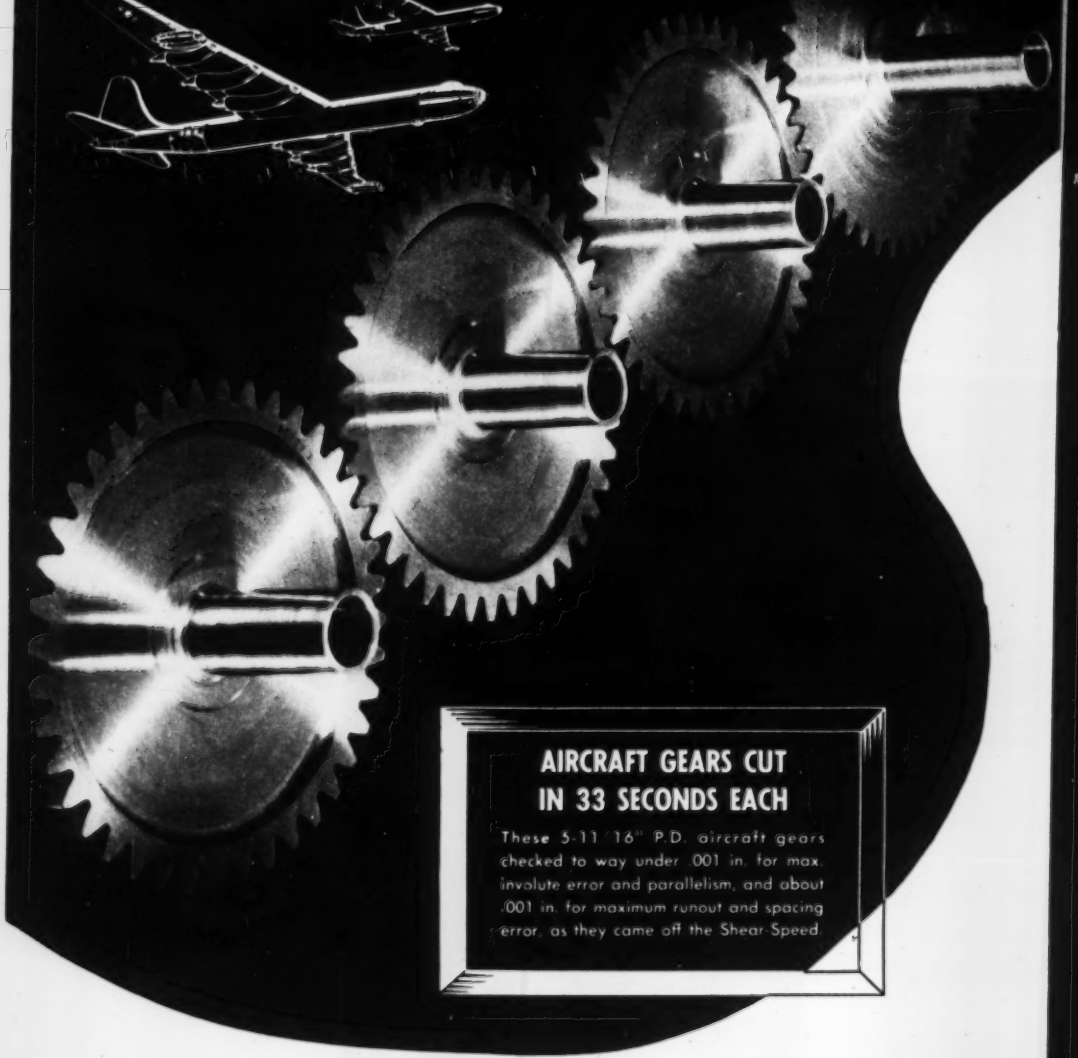
Sharon, Pennsylvania

How to CUT precision





AIRCRAFT GEARS CUT IN 33 SECONDS EACH

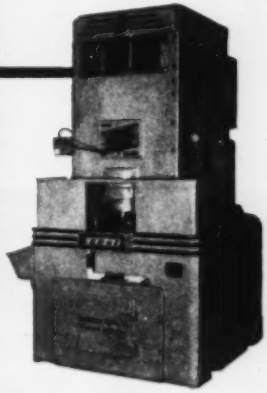
These 5-11/16" P.D. aircraft gears checked to way under .001 in. for max. involute error and parallelism, and about .001 in. for maximum runout and spacing error, as they came off the Shear-Speed.

AIRCRAFT GEARS Faster!

Sure, you can produce precision aircraft gears by slow methods . . . but, WHY do it that way when there is a quick way to do the same thing?

The fastest proven methods to cut precision gears, as used in aircraft, are:

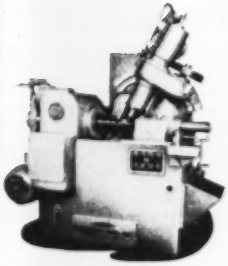
SPUR GEARS



Step 1: Cut all teeth simultaneously on a Michigan Shear-Speed gear shaper. (For time and tolerances, see example at left.)

Step 2: Finish the gears by Michigan "Underpass" (★) shaving, the fastest of all gear finishing methods.

Note: If "ground gears" are specified, Underpass shaving will cut your grinding time in half at negligible cost for the shaving operation.



HELICAL GEARS

Step 1: Hob the teeth on a Michigan #1458 high-speed hobber—the fastest single spindle hobber in the world . . . *faster than most multiple-spindle machines.*

Step 2: Finish as for Spur Gears.

★ *On aircraft pump gears, it may be desirable to use 'Modified Underpass' or 'transverse' shaving, depending on length of run, face width, etc.*

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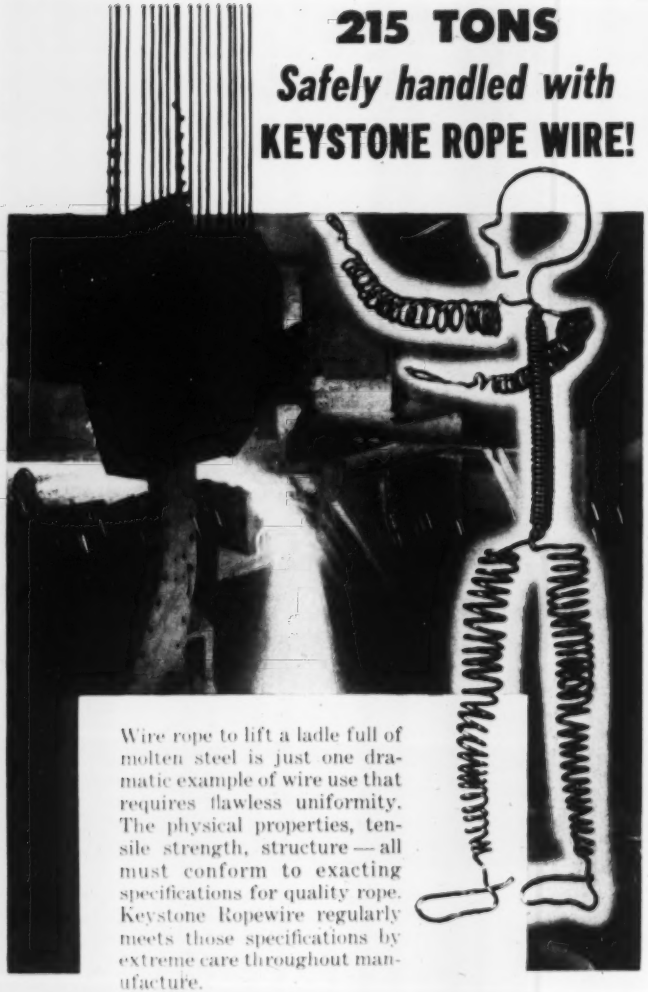
Safely handled with KEYSTONE ROPE WIRE!



Wire rope to lift a ladle full of molten steel is just one dramatic example of wire use that requires flawless uniformity. The physical properties, tensile strength, structure — all must conform to exacting specifications for quality rope. Keystone Ropewire regularly meets those specifications by extreme care throughout manufacture.

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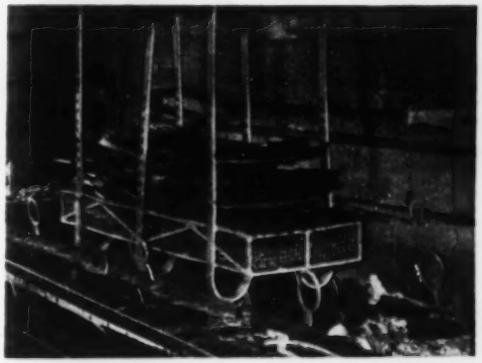
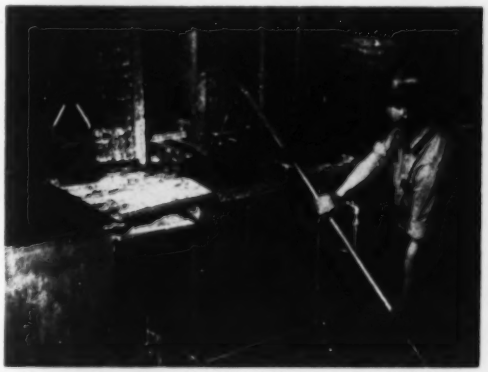
DU PONT 150th Anniversary

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY



ROUGH FORGINGS . . . Scale is quickly and uniformly removed from stainless steel turbine blades between forging operations. Hydride process permits high-speed descaling at low cost . . . can handle many types of metal in a wide range of sizes and shapes.



FINE MACHINED PARTS . . . High-speed steel thread chasers are thoroughly descaled prior to final inspection. Hydride descaling does not attack base metal . . . permits close dimensional accuracy of parts to be maintained—even in fine, recessed areas.

E. I. du Pont de Nemours & Co. (Inc.)
Electrochemicals Department
Wilmington 98, Delaware

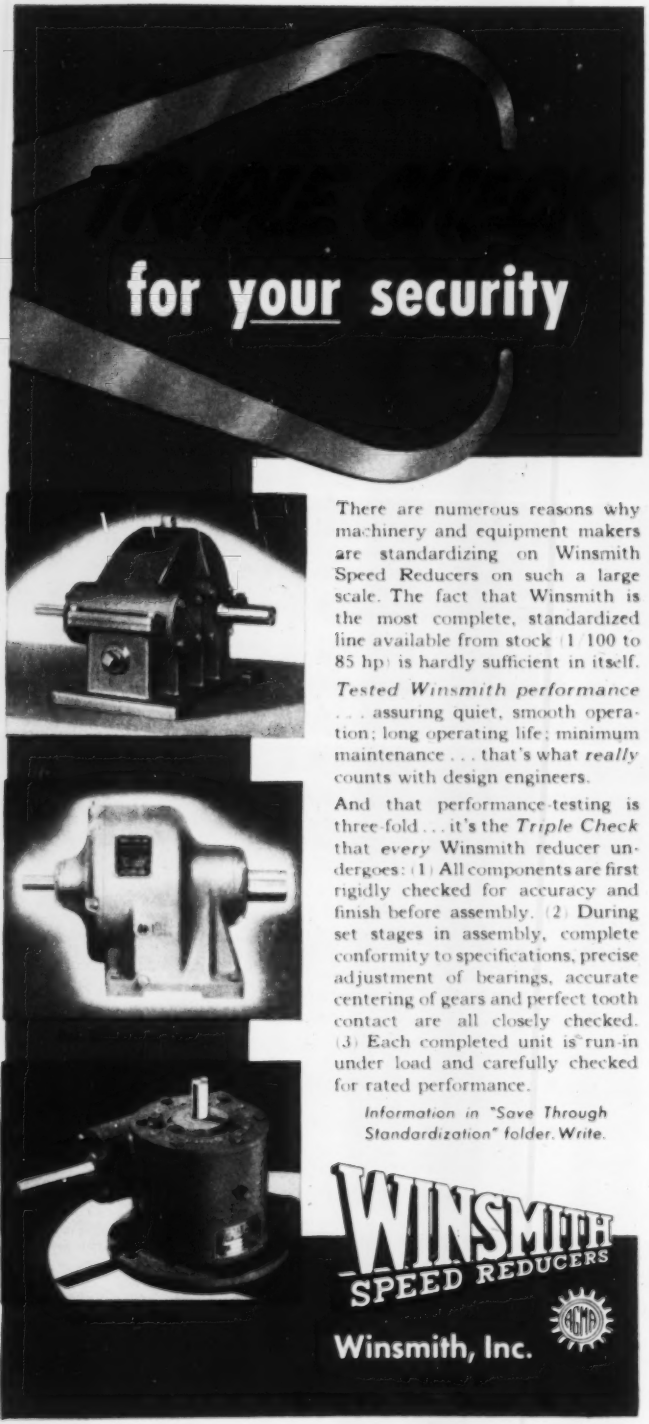
Please send me detailed information on the Du Pont Hydride Descaling Process: advantages, applications, equipment used. I am interested in cleaning_____products.

*Name*_____ *Position*_____

*Firm*_____

*Street and No.*_____

*City*_____ *State*_____


for your security
There are numerous reasons why machinery and equipment makers are standardizing on Winsmith Speed Reducers on such a large scale. The fact that Winsmith is the most complete, standardized line available from stock (1/100 to 85 hp) is hardly sufficient in itself.
Tested Winsmith performance . . . assuring quiet, smooth operation; long operating life; minimum maintenance . . . that's what *really* counts with design engineers.
And that performance-testing is three-fold . . . it's the *Triple Check* that *every* Winsmith reducer undergoes: (1) All components are first rigidly checked for accuracy and finish before assembly. (2) During set stages in assembly, complete conformity to specifications, precise adjustment of bearings, accurate centering of gears and perfect tooth contact are all closely checked. (3) Each completed unit is run-in under load and carefully checked for rated performance.
Information in "Save Through Standardization" folder. Write.
WINSMITH
SPEED REDUCERS
Winsmith, Inc.

LETTERS
TO THE EDITORS

New Birth Arouses Interest

I understand a new company, the North American Steel Co., will begin operating first as an iron and coke plant (Mar. 10, p. 80). That is very interesting news to me since I am associated with and interested in the patent methods covering the Warner Coking Process.

Could you give me information as to executive personnel of North American and whether it's a subsidiary company?

A. J. Hofmann
Narberth, Pa.

● *Our record shows C. A. Depue, as president, and Clark A. Depue, his son as vice president, of the North American Steel Co., Amancac, Iowa. While these two men hold the same respective positions with the Central Steel Tube Co., Clinton, Iowa, we believe the new company is being formed on its own.*

Rectifications from France

Readers of your valuable review, together with the French company SECIM, we pick up in your Feb. 11 issue, p. 63, some inexactitudes dealing with the projected steel plant to be installed at Chimbote, Peru.

May we precise that:

There will be two pig iron electric furnaces of 100 tons per day capacity, of Elektrokemisk's own type, built by Elektrokemisk.

One steel plant with two electric furnaces of 25 ton capacity each will be built under patents of Pittsburgh Lectromelt Furnace Corp. by Stein & Roubaix, building and miscellaneous equipment built by Delattre & Frouard.

Mill equipment is designed by SECIM together with its associates Chavanne Brun and Delattre & Frouard.

May we recall that the contract for supplying of the new plant at Belencito, Colombia, was signed by Delattre & Frouard and SECIM in the name of French manufacturers?

J. Wetsel
Delattre & Frouard Reunis
Paris, France

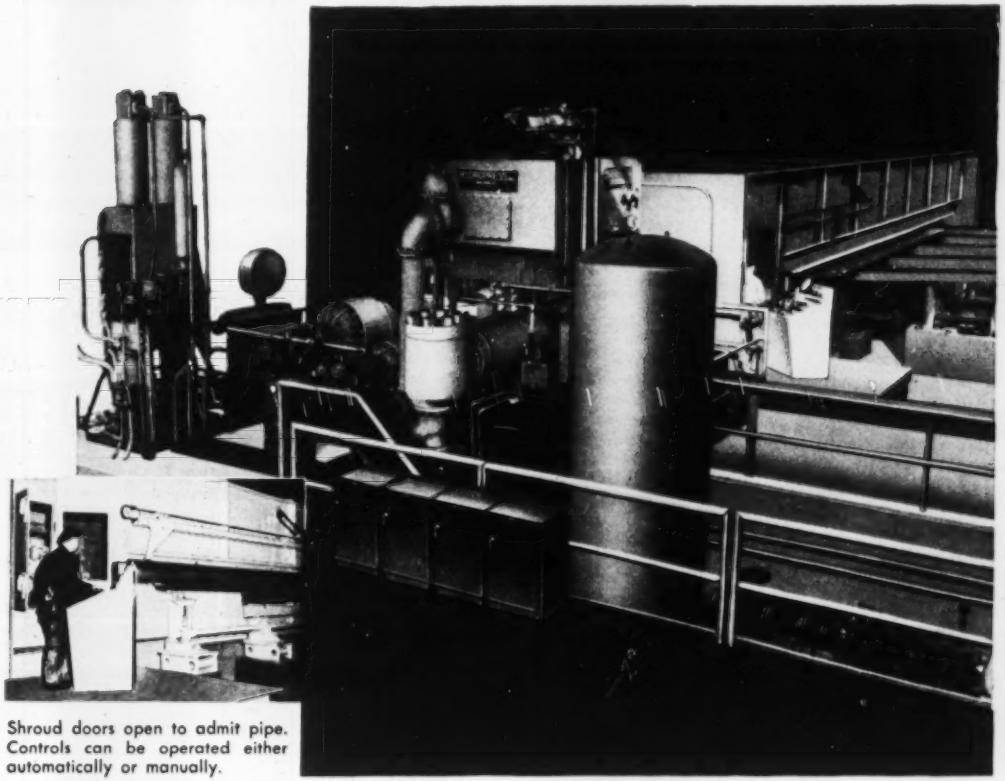
Who and Where Department

We are interested in the new type camera described in your article "360-Degree Photos" (Mar. 3, p. 75). Where can we get full particulars as to price and delivery.

J. B. Morrissey
general purchasing agent
Raymond Concrete Pile Co.
New York

● *Contact the Technical News Letter, Magazine & Book Branch, The Pentagon, Washington.*

10,000 PSI



Shroud doors open to admit pipe. Controls can be operated either automatically or manually.

AUTOMATIC HYDROSTATIC
PIPE TESTING
MACHINES

ONE-MAN OPERATION • HIGH-PRODUCTION RATE • SEAMLESS AND WELDED PIPE

"Half-million dollar proving ground for pipe...to do the job well...."

SAYS THE NATIONAL SUPPLY COMPANY

to whom we supplied this installation for testing seamless steel pipe to pressures up to 80% of the minimum yield strength of the material.

WRITE FOR FULL INFORMATION TO DEPT. 76

LOEWY HYDROPRESS INC
ENGINEERS • CONTRACTORS

Hydraulic Presses • Accumulators • Pumps • Rolling Mills • Die Casting Machines

570 LEXINGTON AVENUE** at 51st Street **NEW YORK 22, N.Y.

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BRIDGEPORT BRASS COMPANY

COPPER ALLOY BULLETIN

"Bridgeport" MILLS IN BRIDGEPORT, CONN. AND INDIANAPOLIS, IND.—IN CANADA: NORANDA COPPER AND BRASS LIMITED, MONTREAL

Electronic Link Eliminates Time Lag in Control Instruments

Measurement and control of such variables as temperature and pressure in chemical and power plants, oil refineries and other process industries must not only be accurate but instantaneous.

The more removed the control center is from the operation being monitored, the greater the time lag of mechanical devices due to friction, resistance, compressibility and other factors.

Time Lag Eliminated

Because of this time lag factor, the illustrated system has been devised in which an electronic link changes pneumatic pressure into direct current, carries it to the recording and control point and reconverts it back to proportional pneumatic pressure. Since only two electrical lines run from the operation point, high pressure lines are eliminated and inflammable liquids and other corrosive media are kept at the source.

Copper and its alloys are used in the electronic section in the form of terminals, wire and other connectors.

Corrosion Resistance Important

In the mechanical or pneumatic section of the system, copper-base alloys are almost universally used to combat the corrosiveness of the moisture which is generally present in the compressed air.

Ease of working and machinability are main factors looked for in materials used for making the valves and fittings in the system.

Since accurate machining is necessary in valve blocks and fittings, free turning brass rod is used (61% copper, 3.4% lead and remainder zinc). This alloy has the highest machinability of all the copper-base materials, has good corrosion resistance to water and finishes are easily obtained.

High Ductility Needed

Depending on whether high or low pressures are involved, either a Bourdon tube or bellows is used.

For the Bourdon tube, a brass with 80% copper, 1% tin and the remainder zinc is usually specified. This alloy has good fatigue as well as corrosion resistance, plus high strength.

The bellows is generally made from a brass containing 80% copper and 20% zinc. This material has high ductility to form the bellows and work-hardens sufficiently to give excellent temper, which in turn gives adequate spring characteristics. For more severe service conditions phosphor bronze (95% copper, 5% tin) is specified.

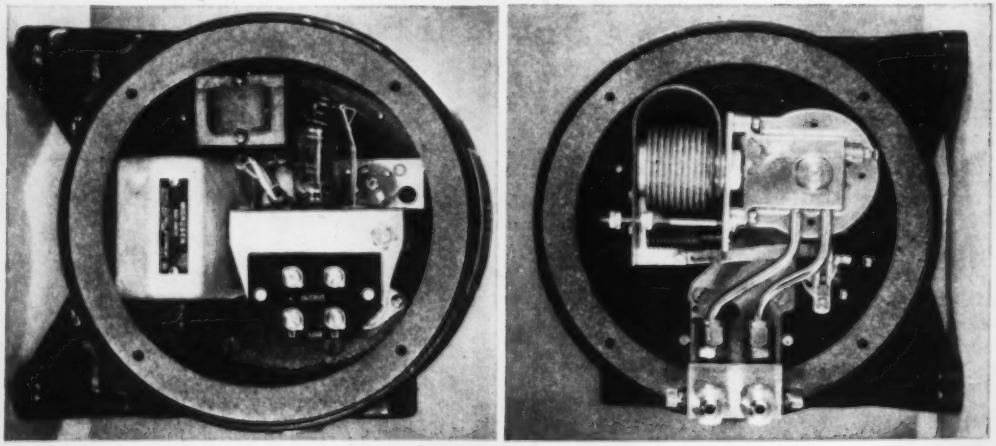
Copper tube is used for the air connectors in the unit.

Phosphor Bronze Used

The metal diaphragm is made from phosphor bronze since this alloy has dependable spring properties, high fatigue resistance and good strength.

Locations of the instruments are often conducive to corrosion, especially where steam and other gases are present. The copper-base alloys resist corrosion from many different gases.

For information about alloys and advice on them for your product, write or call our nearest district office. Our laboratory has compiled much information which may prove helpful in your work. (7952)



Transmitter and receiving transducer for remote control. The covers are removed to show the electronic and pneumatic amplifiers. Courtesy Manning, Maxwell & Moore, Inc., Stratford, Connecticut.

CAUSES OF CORROSION

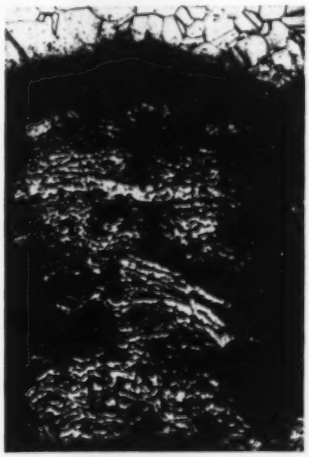
This article is one of a series of discussions by C. L. Bulow, corrosion metallurgist of the Bridgeport Brass Company.

DEZINCIFICATION CORROSION (Cont'd)

It has been recognized that a dezincification inhibitor cannot always prevent the formation of a deposit of copper crystals. This may occur where relatively large quantities of copper salts have been allowed to accumulate or are placed on a brass surface. It can also take place when certain substances react with the inhibitor and render it inoperative.

How Inhibitors Become Ineffective

Sometimes copper oxide and salts slowly accumulate in the corrosion products until the concentration is sufficiently great to force a reversal of the corrosion cell. This results in the reduction of the copper compounds to elemental copper in the form of individual crystals, "trees", or columns of copper, resembling deposits produced by electro plating at a very low potential.



Micrograph of transverse cross-section corroded inhibited Admiralty condenser tubing. Mag. 200X. Upper section shows original microstructure of the metal. The dark portion below shows the deposition of layers of copper which formed over an extended period of time in fresh water having a negative calcium carbonate saturation index.

The micrograph illustrates this type of copper deposit in the corroded area on the surface of inhibited Admiralty tubing containing .04% arsenic. The areas between the striated columns of copper contained much cuprous oxide (brilliant, ruby-red colored when viewed in polarized light). The attack occurred over an extended period in a fresh water having a negative calcium carbonate saturation index.

Individual crystals of copper and tree-like structure have been observed beneath rather thick accumulations of copper salts (corrosion products) in inhibited brasses.

How Dezincification Is Prevented

This type of corrosion can be retarded or prevented by keeping the metal surface clean and not permitting the accumulation of deposits of various kinds. In condenser and heat exchanger tubes subject to fouling by marine organisms, it has been found that scheduled chlorination has been effective in preventing these organisms from attaching themselves to the metal surface. By such measures dezincification has been prevented in brasses containing no dezincification-inhibitor.

Hydraulic Press operates on oil flow in one direction only. A 3¼ inch ram operates through a 4 inch stroke in connection with a valve stem that fits inside the upper portion of the ram on its central axis. Pressure of 1500 lb. provides a 5-ton rating, and 8 gpm will reportedly provide sixty 4-inch strokes per minute. Depending on the pressure, power units can be installed to deliver ratings from 5 to 10 tons. **No. 1222**

NEW DEVELOPMENTS

This column lists items manufactured or developed by many different sources. None of these items has been tested or is endorsed by the Bridgeport Brass Company. We will gladly refer readers to the manufacturer or other sources for further information.

Press Feed grips coil-stock under spring pressure, feeds it into press, and releases it before the die begins working the material. The cam-operated unit is mounted on the bolster plate or die set, and will handle any thickness of coiled stock up to 3/32" by 2" wide. It will transmit a maximum feed length of 2½" from zero movement in an infinite number of pitches. **No. 1215**

Welding Head for welding dissimilar metals is a bench-mounted, press-type unit with single post mounting. Over-all dimensions are 3½" x 9½" x 8½". Either ⅛" or ¼" electrodes can be used interchangeably. **No. 1216**

Optical Dividing Head with fixed base can be used for checking angular dimensions, such as the spacing of spur gear teeth, measuring eccentricity and contours of cams and other shapes, and for checking the accuracy of milling cutters and similar shapes. The unit reportedly will hold and repeat settings to within 0.0005 inch chordal distance on the periphery of a 12" circle, and within 0.0001 inch on a 2" circle. **No. 1217**

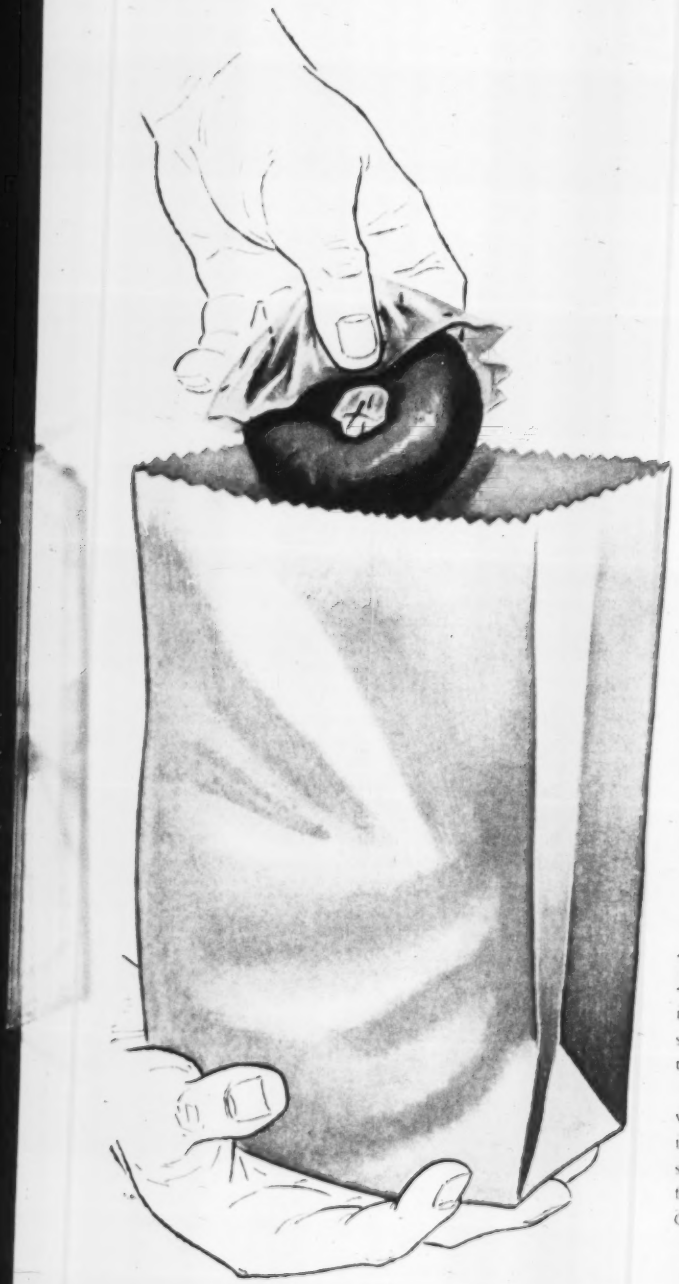
Hole Cutting Saw is said to produce holes up to 4½" in diameter in aluminum, brass, bronze, hard and mild steels, iron and steel pipes and plastics. Used on portable power drills, lathes or drill presses. The saw comes in 40 sizes, ranging from ⅝" to 4½". **No. 1218**

Robot Machinist controls operation of a machine tool. The device consists of a paper tape perforator, a sensor that translates the tape message into electrical impulses, and selsyn motors located on the machine tool that are actuated by the impulses. Perforations on the tape represent dimensions of the part to be machined. A draftsman reportedly can punch the tape from computations made from the blueprint. The only manpower required at the machine is to load and unload the work, replace worn tools, and check tolerances periodically. **No. 1219**

Hardness Tester is less than 5 inches long, weighs less than 5 ounces. It is designed to check surface hardness of non-ferrous extrusions, castings, machined parts and fabrications. **No. 1220**

Buffered Soldering Flux is said to reduce corrosion reaction of copper, brass, bronze, Monel, steel and black iron. The flux lowers surface tension of molten solder, provides powerful scavenging action, and leaves little residue, according to the manufacturer. **No. 1221**

BRASS, BRONZE, COPPER, DURONZE, NICKEL SILVER, CUPRO NICKEL
BRIDGEPORT BRASS
BRIDGEPORT BRASS COMPANY, BRIDGEPORT 2, CONN. • ESTABLISHED 1865
Mills at Bridgeport, Connecticut, and Indianapolis, Indiana • In Canada: Noranda Copper and Brass Limited, Montreal
Warehouse Service with Slitting Facilities in Principal Cities
Advertisement



Like the Thirteenth Doughnut in a Dozen

BAKER'S DOZEN, they used to call it, meaning something extra. We make the *something extra* in the world of steel . . . the high-alloy steels, special electrical alloys and magnetic materials that will do what ordinary metals never could do.

In equipment for peaceful uses or national defense: wherever the job needs something extra in strength, in resistance to heat, corrosion and wear, or in special electrical properties, that's where you'll find the products of the *Allegheny Ludlum Steel Corp. . . . General Offices: Oliver Bldg., Pittsburgh 22, Pa.*

PIONEER in Specialloy Steels

Allegheny Ludlum

WAD 3989

AL TIME-TESTED STAINLESS STEEL

Vol. 1 Published by The DoALL Company, 254 N. Laurel Ave., Des Plaines, Illinois No. 3

New Literature Available From DoALL

1. DIMENSIONAL QUALITY CONTROL WITH DoALL GAGE BLOCKS. 24 page catalog explains and illustrates need for and many uses of DoALL Blocks for checking tools, dies, parts, other gages. Lists all sets, accessories and services.
2. GROUND FLAT STOCK SIZE AND PRICE CHART. Ideal for anyone using tool steel. Shows 238 standard sizes and prices of DoALL oil hardening tool steel.
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7. NEW DECIMAL EQUIVALENT CHART. Real time saver for making fast calculations—fractions in 1/16ths, 32nd and 64th and their decimal equivalents shown in different columns and colors for easy reading.

This literature can be secured from your local DoALL Sales-Service Store or by writing The DoALL Company, 254 N. Laurel Ave., Des Plaines, Ill.

DoALL BAND FILER SAVES TIME, TOOLS, LABOR

Four to Nine Times Faster Than Other Methods, Requires No Special Skill

DoALL Band Filing offers unusual opportunities for reducing costs and increasing production on a wide variety of internal and external filing jobs. The operation is similar to vertical band sawing. The band file, consisting of file segments riveted to a flexible steel band, travels continuously in one direction only, cutting all the time. Filing speed is four times that of jig filing, about nine times that of hand filing. Because there is no backstroke to cause wear and tear, the file bands last longer than jig or hand files.

No special skill is required to operate the band filer. The operator simply guides the work into the file. DoALL Selection Charts tell him which of the wide range of file bands, and what band speed, to use to secure the maximum cutting rate consistent with desired tool life and required finish. The infinitely variable speed range of the DoALL Band Filer is of great value here, permitting the optimum speed for any of the wide range of metals, including new alloys, being used today.

Case Studies

Users reports indicate the savings possible in various applications of band filing. In a large foundry one man is now band filing seven times as many castings as he formerly filed by hand. In another plant 90% of the filing operation on a punch, die and guide plate was being done with a jig file and the remaining 10% by hand. Now a DoALL Band Filer does the job four times as fast as the jig filer and eliminates most of the hand filing.

Often a DoALL Band Filer can do jobs such as slotting or notching and thereby release milling machines, broaching machines and shapers for other work. One plant is now band filing flats on shafts and has released for other work the expensive milling machine formerly used for the operation.

Low capital investment and low operating costs make the DoALL Band Filer a logical addition to any shop where production filing is done. Band filing can also be done with other models of DoALL band machines.

The DoALL Research Laboratory is equipped to run band filing tests on sample pieces submitted and will issue a complete report on the results secured. A Band Filer demonstration will also be conducted at any plant requesting it.

No special skill is required to operate a DoALL Band Filer.

Wide Range of Sizes of DoALL Flat Stock Save Money for User

The 238 sizes of DoALL precision ground oil hardening, flat stock make it possible for tool steel users to purchase the size best suited to their needs and thereby eliminate waste and reduce costs of making tools, dies, parts or gages. Delivery at present is prompt on all 238 standard sizes carried. Special sizes are also obtainable.

* * * *

There are 32 DoALL Sales-Service Stores in the United States, two in Canada and one in Mexico, equipped to conduct free demonstrations of DoALL products in any plant upon request.

. . . CAN YOUR SURFACE

Rigid DoALL Surface Grinders Can Take Heavier Cuts and Produce Precision Work Faster

TRY THE TEST illustrated at the right. Take the heavy cut, reverse the crossfeed and let the wheel run back over the ground surface. If it sparks it is grinding again, showing that the wheel didn't take the full depth of cut on the first pass. If it is a DoALL Grinder it won't spark; in fact, if you stop the work under the wheel and shut off the motor the wheel will coast to a stop without touching the work surface.

Now, pencil mark the work surface. Lower the wheel .0001", start the grinder and the wheel will erase the pencil mark.

There is proof of the rigidity and precision of a DoALL Grinder! There is why it will do a given job in less time. You can take a heavier cut without "give" in the spindle or the table. The wheel doesn't climb over the work piece—it cuts true in one pass. There is no back-lash, slop or hang-up in the vertical column—you can control the vertical feed to lower the wheel as little as .0001" even after a heavy cut.

And, with DoALL "Cool-Grinding"* you can take full advantage of this rigidity and precision—take the heavier cuts without burning the work—get a better finish and sharper edges. Coolant flows in at the hub, *through* the wheel and out *at the point of contact* in a fine mist. There is always coolant where the heat is generated, unlike flood cooling where the wheel blasts the coolant away from point of contact.

There is a DoALL Surface Grinder with hand or hydraulic crossfeed for every toolroom or production requirement. Call your local DoALL Sales-Service Store today or write:

THE DoALL COMPANY

254 N. Laurel Ave., Des Plaines, Illinois

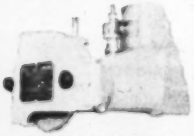
35 Local Sales-Service Stores in North America

* U.S. Patent No. 2470350. Available as extra equipment on all DoALL Surface Grinders.

GR 6

HERE'S WHY DoALL PRECISION HYDRAULIC SURFACE GRINDERS ARE FASTER, MORE RIGID, MORE ACCURATE!

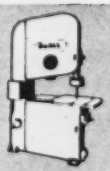
MASSIVE FRAME—column support and base are single-piece chrome nickel steel casting, strongly ribbed for great rigidity.



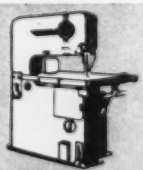
HUSKY SPINDLE SUPPORT, dowelled and bolted to column, prevents wheel from chattering or springing away from work.

VERTICAL FEED IN INCREMENTS OF .0001"—made possible by ridigity and precision of extra-long 30" column.

CONTOUR-MATIC



ZEPHYR

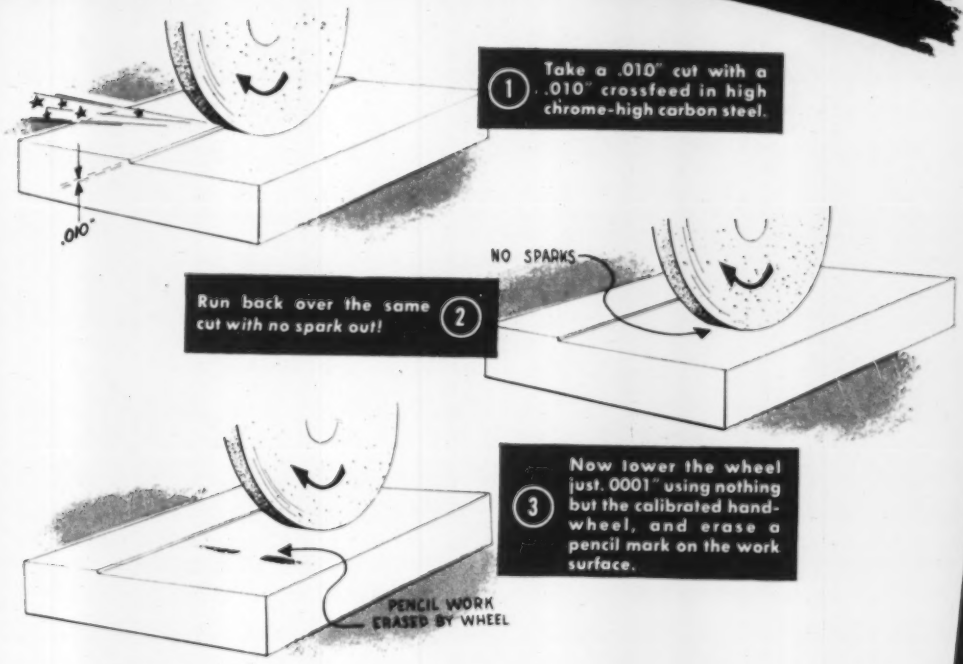


CONTOUR

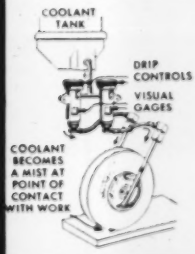
BAND FILER

SAW BANDS

GRINDERS DO THIS?


1 Take a .010" cut with a .010" crossfeed in high chrome-high carbon steel.
.010"
NO SPARKS
Run back over the same cut with no spark out! 2
3 Now lower the wheel just .0001" using nothing but the calibrated hand-wheel, and erase a pencil mark on the work surface.
PENCIL WORK ERASED BY WHEEL

You can see the above test as part of a complete demonstration of a DoALL Precision Surface Grinder right in your own plant, without cost or obligation. Call your local DoALL Sales-Service Store today.

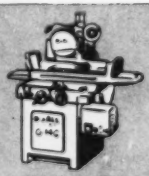


"COOL-GRINDING" ATTACHMENT—reduces cutting temperature as much as 400°F; prevents burning, warpage, checking, skin softness.

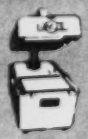
FULL HYDRAULIC *DRIVE* of table and cross-feed, not merely a hydraulic *control* of a mechanical drive. Smoother, longer-wearing, quieter; more uniform motion for smoother finish, greater precision.

DoALL

TOOLROOM GRINDER


CRUSH GRINDER

GAGING EQUIPMENT


MONOLITE

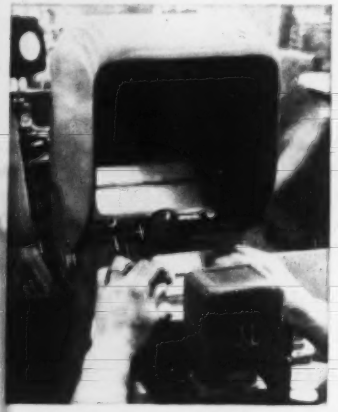
MOBILE INSPECTION UNITS

TOOL STEEL

DoALL Saw Bands Unconditionally Guaranteed

83 Inspections Assure Absolute Certified Quality

"Absolute satisfaction as to quality or replacement at no cost," is the guarantee that goes with every DoALL saw band. The most exacting quality control standards are maintained by DoALL. Special alloy steel for DoALL saw blades is subjected to rigid tests for thickness, width, camber, wedge, lip, edge roughness, edge radius, Rockwell hardness, weldability, cracks, brittleness, tensile strength, yield point, carbide size and distribution. Inspection is **certified** by tagging the tested samples. This record follows the steel throughout manufacture to the ultimate consumer. Many more laboratory, visual and mechanical inspections are carried on during the operations of toothing, setting, heat treating, tempering and on into packaging—during which, other samples are taken and subjected to re-examination. These are but a few of the many inspections that make DoALL saw bands the finest quality blades obtainable for any vertical or horizontal band sawing machine or cut-off saw.

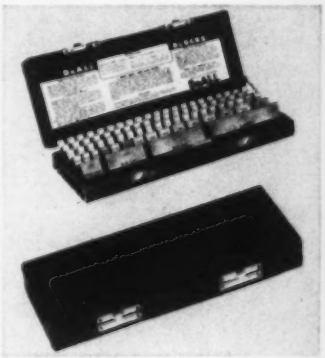


Checking a DoALL saw band sample for accuracy of set with an optical comparator.

New Plastic Box Announced for 83 Piece DoALL Gage Block Sets

An attractive, warp-proof, moisture-proof, jet black plastic box is now being used to house 83-piece DoALL gage block sets. This box is designed to accommodate the blocks in a standing position for easier accessibility. It also has a new "double catch" safety feature. Both catches have to be snapped before the box will open, a safety feature which requires that the box be placed on a bench before it can be opened. This prevents accidental opening of the box and dropping of blocks while case is being carried from one place to another.

The hinged cover of the box can be made to lie flat to provide a tray for safely holding blocks and accessories while in use.



Helpful information regarding use, temperature control, identification, calibration, general care and service of DoALL blocks is found on a label affixed to the underside of box cover.

The new plastic boxes are available separately to present owners of 83-piece gage block sets who wish to replace old wooden containers.

CALL DoALL locally at these Sales-Service Stores

BALTIMORE 12, MD.
5621 York Rd.
Call DoALL: Hopkins 5340

BIRMINGHAM 4, ALA.
800 N. 24th St.
Call DoALL: Birmingham 3-0502

BROOKLINE 46, MASS.
89 Washington St.
Call DoALL: Longwood 6-9555

CEDAR RAPIDS, IOWA
624 Fifth St., S.E.
Call DoALL: Cedar Rapids 3-0616

CHARLOTTE 2, N. C.
405 S. Mint St.
Call DoALL: Charlotte 4-2579

CHICAGO 39, ILL.
4650 W. Fullerton
Call DoALL: Albany 2-5300

CINCINNATI 2, OHIO
536 Sycamore St.
Call DoALL: Main 3929

CLEVELAND 3, OHIO
6517 Euclid Ave.
Call DoALL: Express 1-1177

DALLAS 2, TEXAS
1628 Industrial Blvd.
Call DoALL: Sterling 3819

DAYTON, OHIO
725 S. Main St.
Call DoALL: Michigan 2121

DETROIT 27, MICH.
15010 Plymouth Rd.
Call DoALL: Broadway 3-4141

DENVER 4, COLO.
1187 Stout St.
Call DoALL: Alpine 7444

GRAND RAPIDS 7, MICH.
410 Hall St., S.E.
Call DoALL: 5-2191

HARTFORD 5, CONN.
45 Farmington Ave.
Call DoALL: Hartford 5-6664

HOUSTON 2, TEXAS
121 St. Emanuel
Call DoALL: Capital 6588

INDIANAPOLIS 2, IND.
1401-3 N. Illinois St.
Call DoALL: Plaza 6496

JACKSONVILLE 7, FLA.
1106 Kings Ave.
Call DoALL: Jacksonville 9-7087

KANSAS CITY 6, MO.
1019 E. Truman Rd.
Call DoALL: Harrison 5857

LOS ANGELES 21, CALIF.
1316-18 S. Santa Fe
Call DoALL: Trinity 3871

MILWAUKEE 5, WISC.
2427 W. North Ave.
Call DoALL: Division 2-2950

MINNEAPOLIS 14, MINN.
2510 University Ave., S.E.
Call DoALL: Gladstone 1173
St. Paul—dial red "O" for Zenith 2399

NEW YORK 10, N. Y.
67 Lexington Ave.
Call DoALL: Murray Hill 4-1514

NUTLEY 10, N. J.
88 Park Ave.
Call DoALL: Nutley 2-6767

PHILADELPHIA 24, PENNA.
2053 E. Glenwood Ave.
Call DoALL: Cumberland 8-7400

PITTSBURGH 21, PENNA.
600 Rebecca Ave.
Call DoALL: Fremont 1-5200

ROCHESTER 5, N. Y.
215 Central Ave.
Call DoALL: Hamilton 8420

ROCKFORD, ILL.
123 Seventh St.
Call DoALL: Rockford 47848

SAN FRANCISCO 3, CALIF.
952 Howard St.
Call DoALL: Garfield 1-4784

SEATTLE 22, WASH.
520 E. Pike St.
Call DoALL: East 7500

ST. LOUIS 6, MO.
1945 N. Broadway
Call DoALL: Central 3620

TOLEDO 6, OHIO
2952 Monroe St.
Call DoALL: Garfield 8309

TULSA, OKLA.
207 W. Archer St.
Call DoALL: 35443

CANADA

MONTREAL, QUEBEC
583 Inspector St.
Call DoALL: University 1264

TORONTO 10, ONTARIO
37 Clarkson Ave.
Call DoALL: Redfern 4238

MEXICO

MEXICO CITY, D. F.
Maestro Antonio Casso #48
Call DoALL: Mexicana 36-27-95
or Ericcson 18-63-74

No. 3—88M—3 52

PRINTED IN U.S.A.

Uncle Sam Buys Many Rotating Bands from WOLVERINE

These rotating bands are made of Wolverine seamless tube of either copper or gilding metal in the following sizes: 20mm, 60mm, 75mm, 76mm, 90mm, and 105 mm. They are produced under most exacting specifications.

Wolverine engineers are continually carrying on research in the development and production of many items required for the defense program, and in past emergencies Wolverine has been one of the many important sources for military equipment which called for tubing in some form or another.

Wolverine's long experience exclusively in tube making—dating back through several emergencies—embodies a specialized skill and talent to meet the most rigid demands in the production of tubing and tubular parts.

WOLVERINE TUBE DIVISION
Calumet & Hecla Consolidated Copper Company
INCORPORATED
Manufacturers of seamless, nonferrous tubing
1439 CENTRAL AVENUE • DETROIT 9, MICHIGAN

also

STEEL PRIMER TUBES

We have produced quantities of steel primer tubes—both in low carbon steel and in brass in accordance with government specifications.

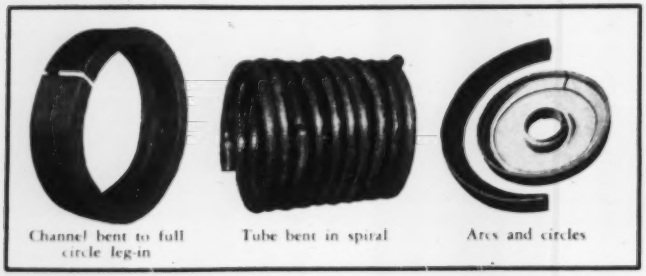
If it's tubular, we can help you produce it. Send us your prints for consideration and quotation.

PLANTS IN DETROIT, MICHIGAN AND DECATUR, ALABAMA
Sales Offices in Principal Cities

Export Department, 13 E. 40th St., New York City 16, N. Y.

"Buffalo" Tips on Metal Bending

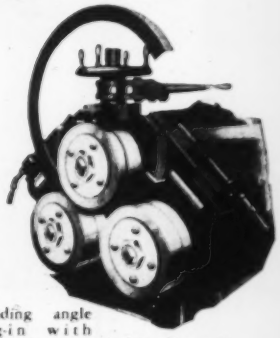
GETTING THE FULLEST USE FROM THE BENDING ROLL—



Channel bent to full circle leg-in

Tube bent in spiral

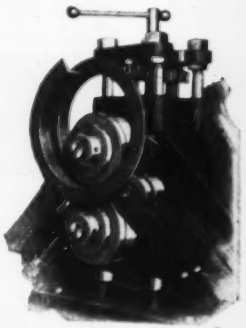
Arcs and circles



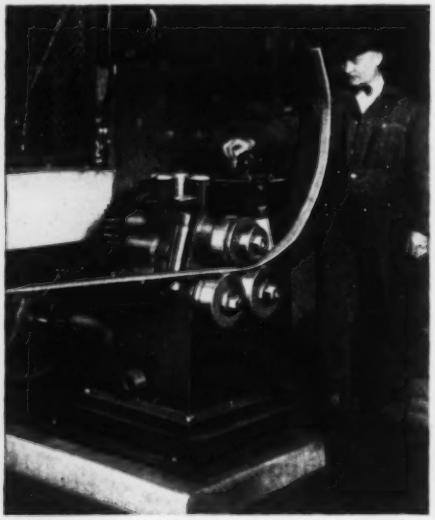
Bending angle leg-in with pyramid type vertical bending roll.

EASILY CHANGED ROLLS OPEN UNLIMITED POSSIBILITIES

Those who own "Buffalo" Bending Rolls know that they are the fastest and cheapest method of producing arcs, spirals and circles accurately. Not so well known is the wide variety of jobs these machines will handle. Square stock is rolled in coils for ring gears by the automotive industry. Many lawn mower manufacturers bend and twist reel blades with their rolls at rates of around 400 an hour. Also, because rolls are so easily and quickly changed, it is practical to obtain special rolls and increase the versatility of the machine. Below are some examples:



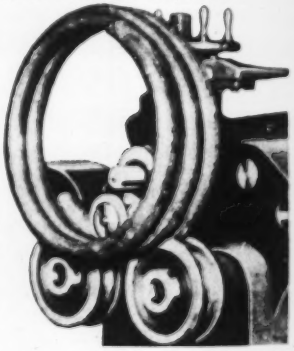
Bending angle leg-out in spiral with one pass on vertical pinch type roll.



"Buffalo" No. 1½ Vertical Bender rolling flats on flat. Very small diameters can be obtained at a single pass.

1. Angles, leg-out
2. Angles, leg-in
3. Beams on flanges
4. Channels, flanges in or out
5. Flats on edge
6. Flats on flat
7. Rounds
8. Squares
9. Copper tubes
10. Standard St. pipe
11. Heavy pipe
12. Heavy pipe

BULLETIN 352-C, with helpful information on bending, is yours on request.



Bending tubing with small - diameter attachment and special rolls.

"Buffalo" MACHINE TOOLS

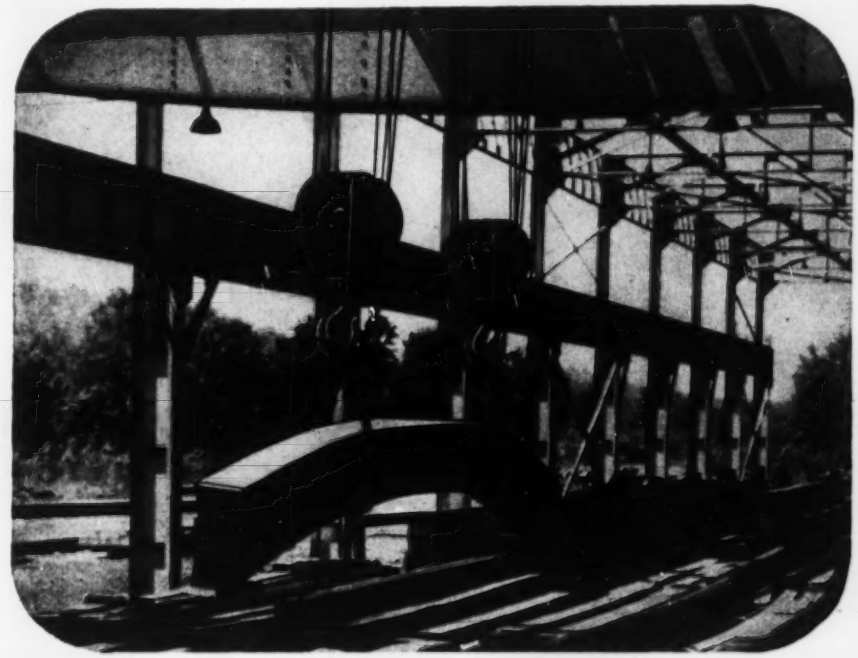
BUFFALO FORGE COMPANY

158 MORTIMER STREET BUFFALO, NEW YORK

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

DRILLING PUNCHING SHEARING CUTTING BENDING

WIRE ROPE



This is the longest-lasting rope we've ever made for industrial use

ROEBLING HAS been making wire rope for more than a hundred years. And during all that time we've been developing new kinds of rope, and making them better.

Today, about the first thing you ask about a wire rope is, "Has it got what it takes? Will it stand up and cut replacements?"

Our answer is an emphatic *yes*, because Roebling Preformed Blue Center Steel Wire Rope meets the severest tests of tensile strength, abrasion resistance and general toughness.

There's a Roebling rope that will prove the longest-lasting and most economical in your operations. Call on your Roebling Field Man for his recommendations. John A. Roebling's Sons Company, Trenton 2, New Jersey.

ROEBLING

ATLANTA, 924 AVON AVE. • BOSTON, 51 SLEEPER ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 3253 FREDONIA AVE. • CLEVELAND, 701 ST. CLAIR AVE., N. E. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 HARBOR ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, TRENTON 2, N. J.

NOW! 50% More Power

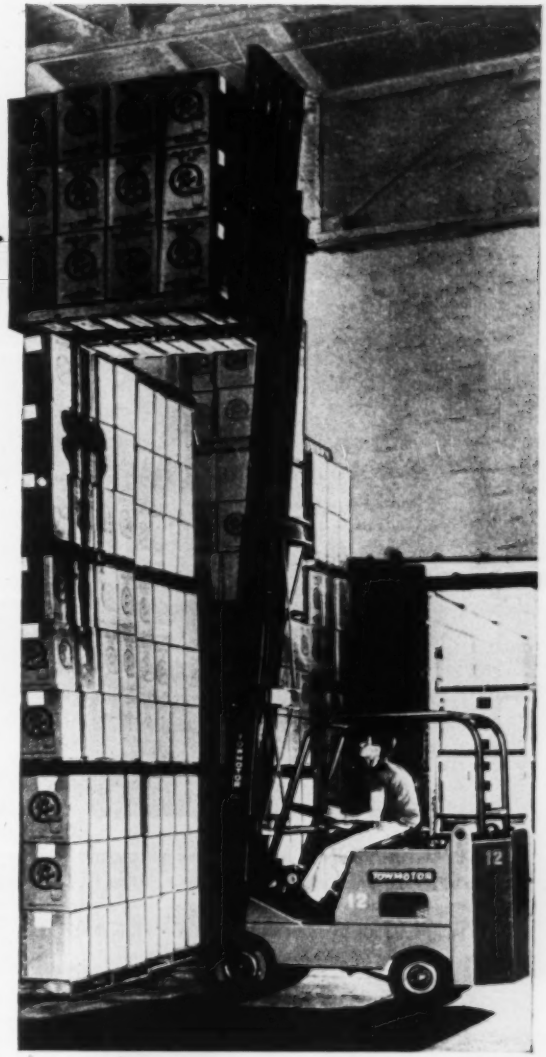
for the world's finest portable power driver!

THAT'S RIGHT! This powerful, new Black & Decker SCRUGUN is loaded with features that save you time, money and man-hours on the assembly line! Let your nearby B&D Distributor prove it to you with a demonstration. Or write for full details to: THE BLACK & DECKER MFG. CO., 620 Pennsylvania Ave., Towson 4, Maryland.

BLACK & DECKER 30 Factory Branches SERVICE

... use them to save time, trouble and money!

20-ft. of Power



Towmotor-engineered for peak performance 24 hours a day

From the top of this 20-ft. ceiling-high reach, right down to the floor, every inch of Towmotor is engineered for peak performance. That means *power* to lift and transport full rated loads all day long; *tireless stamina* to assure trouble-free operation for years; and *rabbit-like agility* to zip in and out of tight spots swiftly and effortlessly.

But see for yourself WHY Towmotor engineering assures *you* of lowered costs in every job of Receiving, Processing, Storage and Distribution. Write for the illustrated booklet "What Makes It Tick?" —the inside story of Towmotor. Towmotor Corporation, Div. 16, 1226 E. 152nd St., Cleveland 10, Ohio. Representatives in all principal cities in U.S. and Canada.

Available on request, "What Makes It Tick?" describes 24 famous Towmotor engineering features.

TOWMOTOR
THE ONE-MAN-GANG

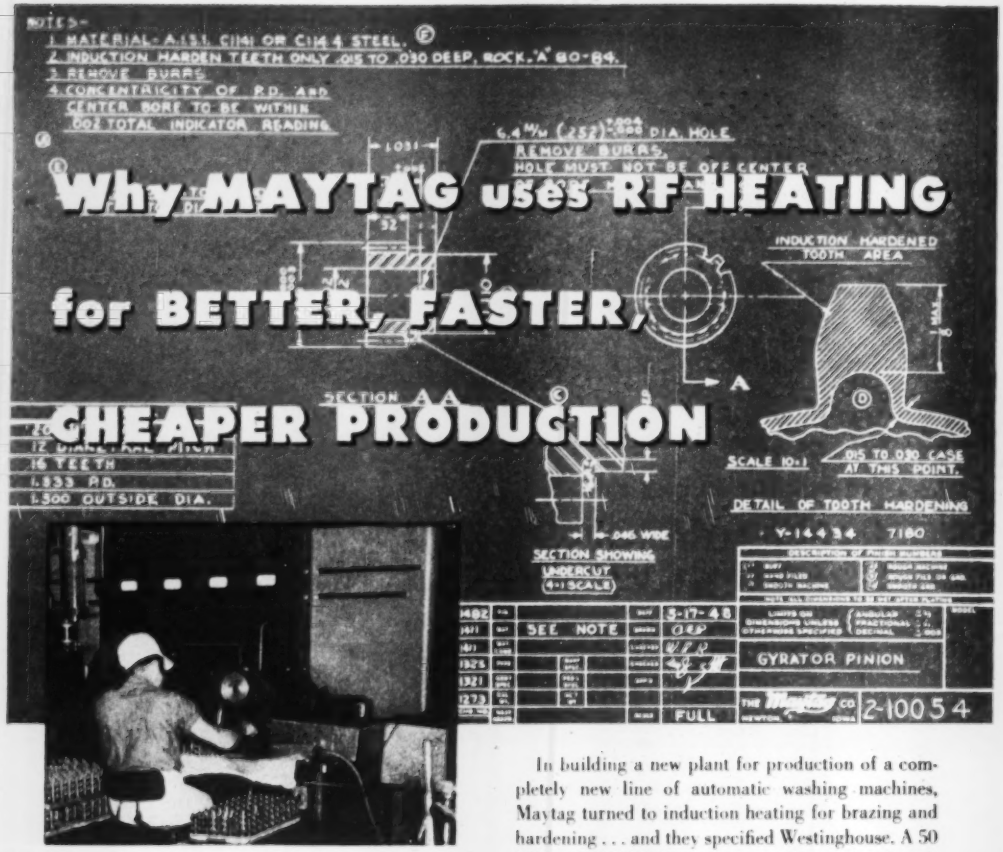
FORK LIFT TRUCKS AND TRACTORS

RECEIVING • PROCESSING • STORAGE • DISTRIBUTION

14 Towmotor models easily handle loads from 1,500 to 15,000-lbs.—a Towmotor for every job . . . your job.

HOW MANY PEOPLE HAVE YOU TALKED TO ABOUT **AMERICANISM** TODAY?

Why MAYTAG uses RF HEATING for BETTER, FASTER, CHEAPER PRODUCTION



● The Maytag Company has found, for fast production at low cost and high quality, Westinghouse RF Heating installations are the answer.

The installation of a process using two 20 KW-450 generators—for both spline and straight shaft hardening—has paid for itself in *less than 3 months!* This was shortly after World War II, and since then continued use has piled up real profit in savings.

In building a new plant for production of a completely new line of automatic washing machines, Maytag turned to induction heating for brazing and hardening . . . and they specified Westinghouse. A 50 KW and 10 KW RF generator, with associated work handling equipment, are now accounting for still further savings and continued high quality. That's why Maytag says that not only is the Westinghouse RF process the best method for heat treating production parts, but, also, "it produces precision work at the price of rough and ready work."

As we helped Maytag, let us help you solve your problems of increased production at low cost and with high quality. By all means, investigate the possibilities of installing Westinghouse RF Heating.

Westinghouse Electric Corporation
Department S-41
2519 Wilkens Avenue · Baltimore 3, Maryland

Send me your informative case history booklet on induction heating.

Name

Company

Street

City Zone State

J-03341

INDUCTION HEATING

As reported in PLANT ENGINEERING, September 1951

Salvage at Consolidated-Vultee Pays off 10 to 1

Convair's C-Men (for conservation) made $10 for every $1 spent on salvage operations.

Detroit-Edison Salvages Millions

D-E's Stores Salvage Division last year handled over $3,000,000 worth of salvage—ranging from lamp bulb bases to old power plants.

Salvage, Scrap, Economy Linked at Westinghouse

Careful housekeeping and a 16-year old salvage program cut operating costs, earn a profit for Appliance Division.

What you can get

from an organized Salvage Program in your plant!

1 **YOU GET A PROFIT**—as much as $12,000 to $1,500,000 per year. That's the range of estimates reported in a recent survey of leading manufacturers. This is profit, after deducting all costs of operating salvage programs. It includes all materials and products salvaged, including iron and steel scrap.

2 **YOU GET MORE PRODUCTION** — Organized salvage programs return scarce strategic materials to production lines. They cut waste to the bone, recover losses, help keep production departments going. Cleaning out scrap piles puts valuable floor and yard space back to work.

3 **. . . AND HELP YOUR DEFENSE PROGRAM** It takes *one* ton of your old pipe fittings, obsolete machinery, tools, dies, rails, chain, rusted out tanks and boilers, discarded bolts and nuts, to make two tons of steel. You know how badly your nation needs that new steel . . . for defense . . . for production . . . for construction . . . and for civilian needs.

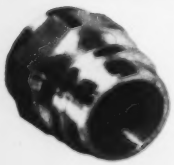
ORGANIZE YOUR SALVAGE PROGRAM NOW!

To the nation, iron and steel scrap is the most important segment of any scrap and salvage campaign. The procedure of returning scrap to the mills is far simpler than even the most elementary salvage program. Scrap commands an excellent price. So, appoint a scrap collection team. Study locations which are potential sources of this vital commodity. Don't overlook a single possible supply. Turn it up and turn it over . . . to your scrap dealer for cash.

REPUBLIC STEEL

REPUBLIC STEEL CORPORATION
GENERAL OFFICES • • • CLEVELAND 1, OHIO

STANICUT
TRADE MARK
Cutting Oil



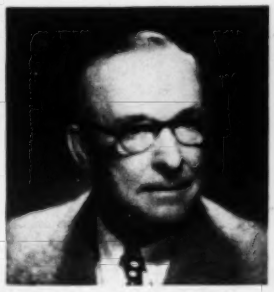
Combines better finish, longer tool life

Manufacturers of this aluminum alloy valve had two objectives in mind when they asked their Standard Oil lubrication specialist for his recommendations on a cutting oil. They were looking for a better finish on their product and longer life for their cutting tools.

STANICUT Oil 62 FC answered their needs. Used as a base oil, it replaced a soluble oil emulsion previously used. The finish is more than satisfactory and operators are obtaining 4,000 to 5,000 pieces per grind. While the job was originally set up on a basis of 97 pieces per hour, production now runs 125 pieces per hour.

To put STANICUT to work to similar advantage in your own screw machine department, or for help in solving any problem in industrial lubrication, call for the services of your own Standard Oil lubrication specialist. Contact your nearest Standard Oil office or write: Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.

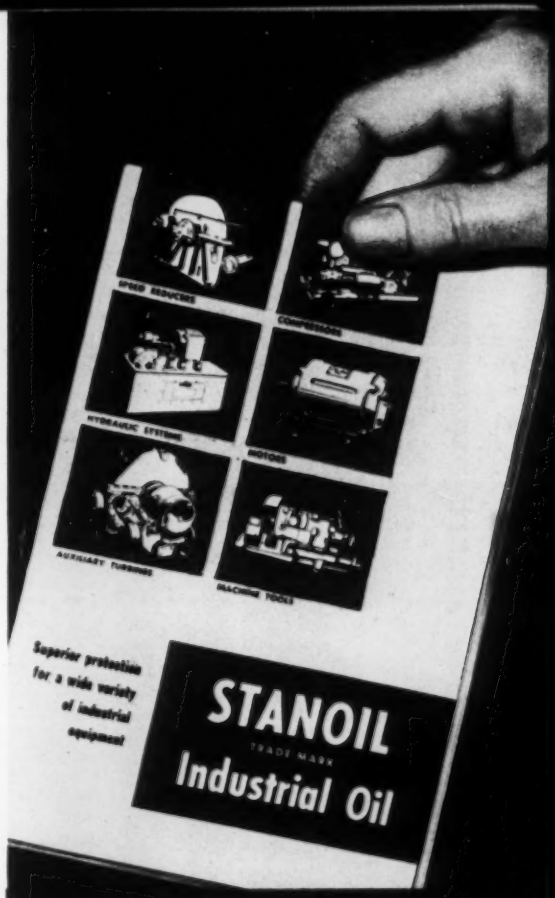
What's YOUR problem?



W. R. Winter, of Standard Oil's Milwaukee office, has worked closely with the industrial plants in his area for many years and was able to offer operators of this plant the kind of help they needed when they needed it. His recommendation for the use of STANICUT Cutting Oil resulted in important savings for the manufacturer.

Like all Standard Oil lubrication specialists, he has a broad background of practical experience plus thorough training in Standard's own schools. And like all lubrication specialists, his on-the-job help is always available. He is one of a corps of experienced men who make their headquarters wherever industry is located throughout the Midwest.

For help with your problem, call for the services of your Standard Oil lubrication specialist today! A call to your local Standard Oil office is all that's necessary.



Send for this booklet

SEE WHAT STANOIL OFFERS YOU

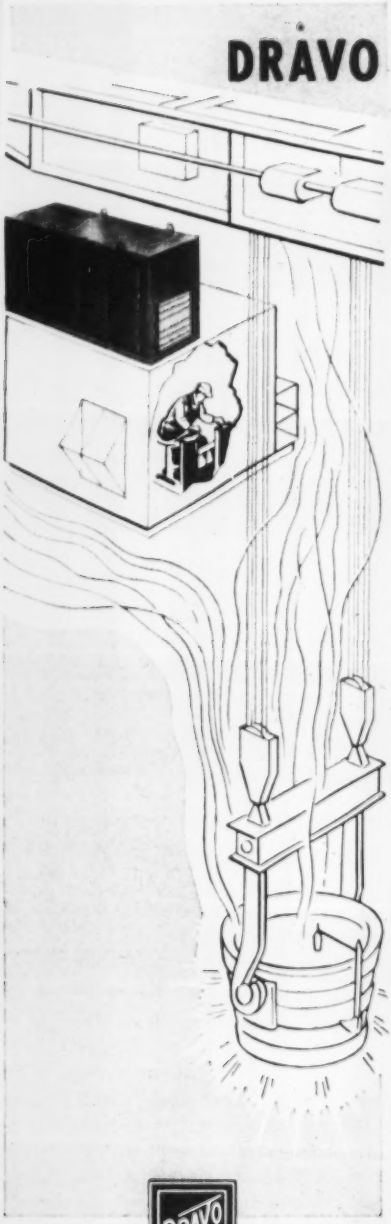
STANDARD

STANDARD OIL COMPANY

(I N D I A N A)

• You'll find the means to significant savings in this booklet. It describes the important qualities of STANOIL Industrial Oil and the resultant benefits which have made this multi-purpose oil the choice of midwest manufacturers for a host of lubricating jobs. Discover how STANOIL will give you superior protection through its unique combination of six outstanding characteristics, including high stability and effective rust prevention. Find how STANOIL can simplify stock, storage, and inventory in your plant by replacing special-purpose oils in a wide variety of equipment. Ask the Standard lubrication specialist from your nearby Standard Oil office for this booklet, or write: Standard Oil Company (Indiana), 910 South Michigan Ave., Chicago 80, Illinois.

DRAVO CRANE CAB COOLERS



cool off the HOT SPOTS

Extreme temperatures ranging as high as 225° F. in crane cabs operating over soaking pits, ladles, chargers, and similar "hot spots," reduce the alertness, efficiency, and health of crane operators.

Dravo Crane Cab Coolers maintain comfortable working conditions and supply clean, pure air to men working under adverse conditions—with a consequent substantial improvement in the overall safety and production of the department served.

AVAILABLE IN EITHER SELF-CONTAINED OR SPLIT-TYPE UNITS

Dravo Crane Cab Coolers are built in two models—the self-contained unit, mounted on any available space on the crane, and the split-type unit.

Split-type units are ideal where cabs are located in the center of the crane, because the condenser section is located over the crane trucks and the light evaporator section is in the cab with the operator, the two sections joined only with refrigerant pipe and electrical connections.

IMMEDIATE DELIVERY AND QUICK INSTALLATION

The Dravo Crane Cab Cooler can be easily and quickly installed on any type of crane with a minimum of down-time required. Units are available now. Write for more information—or phone the nearest Dravo office and have our representative call on you.

DRAVO

DRAVO

CORPORATION

606 Dravo Building, Fifth and Liberty Avenues, Pittsburgh 22, Pa.

ATLANTA • BOSTON • CHICAGO • CLEVELAND • DETROIT • NEW YORK • PHILADELPHIA • PITTSBURGH

Steel veins for iron horses

Steel veins for iron horses—strong, durable veins easily forged and fabricated to exact requirements—this is but one of the many applications for OSTUCO Tubing in products of modern design, products that strengthen America and the free world.

OSTUCO Tubing presents endless opportunities for improving design in almost every field. In addition to infinite adaptability, OSTUCO Tubing offers such advantages as maximum strength with minimum weight, good surface conditions for finishing, excellent machinability, and low cost. We cannot always promise early delivery estimates on new civilian orders, because of military demands, but it will pay you to consult our experienced engineers about OSTUCO Tubing when redesigning your products to meet future competition.

THE OHIO SEAMLESS TUBE COMPANY

Manufacturers and Fabricators of Seamless and Electric Welded Steel Tubing

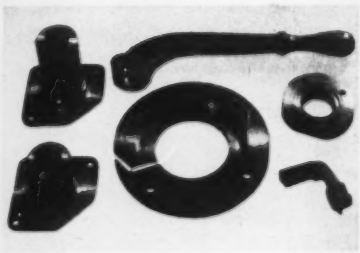
Plant and General Offices: SHELBY, OHIO

OSTUCO SHELBY OHIO

SALES OFFICES: Birmingham, P. O. Box 2021 • Chicago, Civic Opera Bldg., 20 N. Wacker Dr. Cleveland, 1328 Citizens Bldg. • Dayton, 511 Salem Ave. • Detroit, 520 W. Eight Mile Road, Ferndale • Houston, 6833 Avenue W, Central Park • Los Angeles, Suite 300-170 So. Beverly Drive, Beverly Hills • Moline, 617 15th St. • New York, 70 East 45th St. • Philadelphia, 1613 Packard Bldg., 15th & Chestnut • Pittsburgh, 1206 Pinewood Drive • St. Louis, 1230 North Main St. • Seattle, 3104 Smith Tower • Syracuse, 501 Roberts Ave. • Tulsa, 733 Kennedy Bldg. • Wichita, 622 E. Third St. • *Canadian Representative:* Railway & Power Corp., Ltd.

"fully satisfies loading conditions..."

So again the choice is: GRAY IRON



Specify gray iron for smaller operating parts, too, like these components of the torque control pictured above.

MAKE IT BETTER WITH GRAY IRON

Second largest industry in the metal-working field

BECAUSE GRAY IRON DOES THE JOB AT LOWER COST, the designer specified gray iron castings for this torque control housing. He knows you can't beat gray iron for ready machinability at a specified pressure strength level.

GRAY IRON GIVES YOU ALL THESE ADDED PRODUCTION ADVANTAGES: Castability, rigidity, low notch sensitivity, wear-, heat- and corrosion resistance, durability, vibration absorption, wide strength range.

SO SPECIFY GRAY IRON when you need a part that must meet many structural and functional requirements—with economy. We know gray iron will satisfactorily serve your needs.

SCRAP IS NEEDED FOR DEFENSE—KEEP IT MOVING!

GRAY IRON FOUNDERS' SOCIETY, INC.

NATIONAL CITY-E. 6th BLDG., CLEVELAND 14, OHIO

PITT CHEM *Quality Control*

assures you better, longer-lasting protection

Pitt Chem quality-controlled Tar Base Coatings have an unmatched record of performance in protecting industrial structures and equipment from corrosion. They're easy to apply, low in cost and effective against a wide variety of chemical and atmospheric corrosive conditions above and below ground. And these tough, durable protective coatings have up to ten times the film thickness of ordinary paints and last for years under conditions that usually cause ordinary paints to fail in months.

You can depend on Pitt Chem Tar Base Coatings for top uniform quality because we control every phase of production from coal to finished coating—in a plant designed *exclusively* for the manufacture of tar base coatings. That's your assurance of top-grade application characteristics, uniform bond and maximum protection. ● More product information, technical data, or field application assistance will gladly be sent on request.

Write For FREE
Corrosion Control Booklet

Tells where tar base coatings can save you money in your plant . . . what grades to use . . . how to apply them.

W&D 4096

PITT CHEM 101
A versatile, heavy duty coating that withstands severest corrosive conditions.

PITT CHEM 102
A thin, high gloss maintenance coating for steel and concrete surfaces.

PITT CHEM 103
A heavy duty coating for metal exposed to corrosive vapors, dilute acids and alkalis.

PITT CHEM 104
A fast drying, high gloss coating for equipment handling potable water.

PITT CHEM SYNTHETIC COATINGS

PITTSBURGH
COKE & CHEMICAL CO.

COAL CHEMICALS • AGRICULTURAL CHEMICALS • PROTECTIVE COATINGS • PLASTICIZERS • ACTIVATED CARBON • COKE • CEMENT • PIG IRON

Nothing Like a Slitter

FOR SPEEDING PRODUCTION SCHEDULES

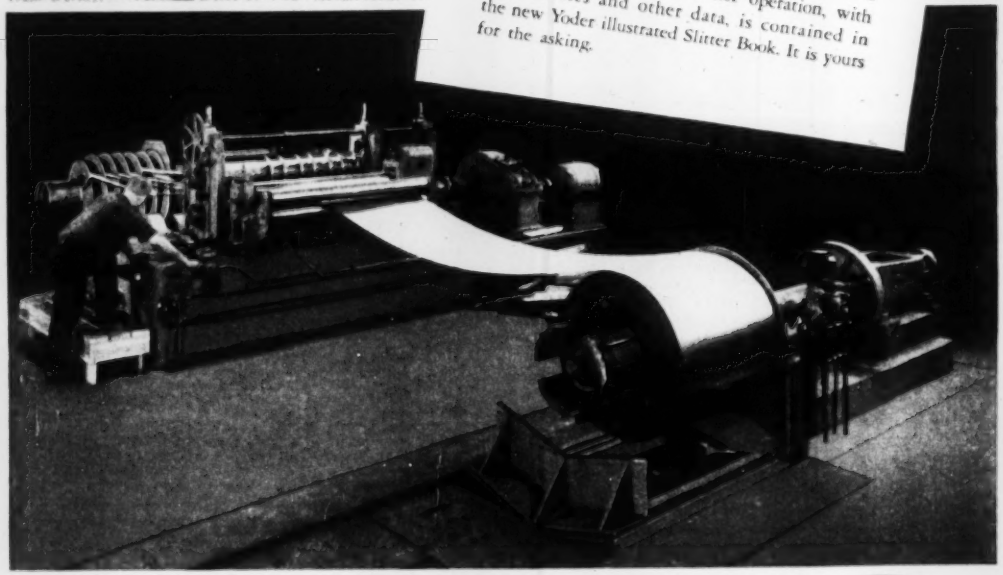
If you have a Yoder slitter you can buy mill-width coils instead of slit strands. Sources of supply of mill-width coils are more numerous, so you can buy wherever you like, at substantially lower prices, and obtain quicker deliveries.

Inventory requirements, too, are greatly reduced, because you can, in a few hours, meet expected and unexpected demands for slit strands with a relatively small stock of mill-width coils of the proper gauges.

This means better control not only of coiled strip supply, but of production planning; and production schedules are much easier to meet.

For requirements as low as 100 tons per month, direct savings alone may be sufficient to repay your investment in a Yoder slitter in the short time of a year.

Information on the respective merits of different types and sizes of slitters and accessories, as well as on the economics of slitter operation, with time studies and other data, is contained in the new Yoder illustrated Slitter Book. It is yours for the asking.



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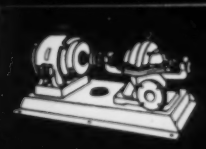

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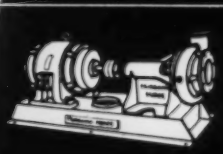
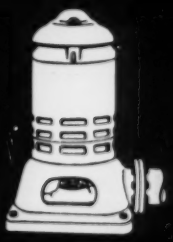
Capacities: 100-560 G.P.M.

Builtogether
Centrifugal Pumps
Capacities: 5-1000 G.P.M.

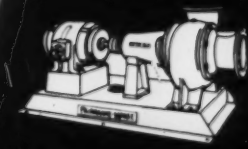
Frame Constructed
Rotary Pumps
Capacities: 1.3-450 G.P.M.



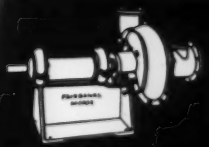
Base-Mounted Centrifugal Pumps
Capacities: 25-3000 G.P.M.



Deep Well Turbine Pumps
Capacities: 15-25,000 G.P.M.

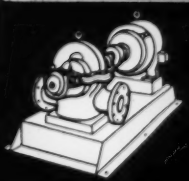


Horizontal Angle Flow Pumps
Capacities up to 100,000 G.P.M.



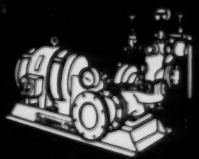
Paper Stock Pumps
Capacities up to
2500 G.P.M.

Rotary Pumps
With Geared Head Motor Drive
Capacities: 20-450 G.P.M.



Split-Case Centrifugal Pumps
Capacities: 50-30,000 G.P.M.

Two-Stage Builtogether Pumps
Capacities: 5-1000 G.P.M.

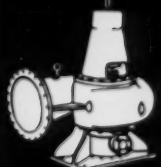


Centrifugal Fire Pumps
Capacities: 500-2000 G.P.M.

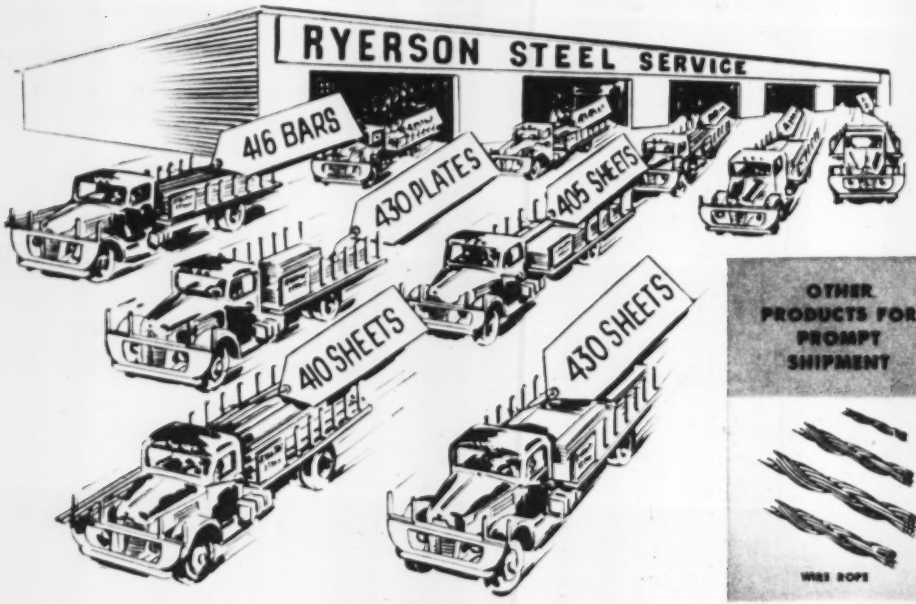
Bladeless Impeller
Food Handling Pumps

Vertical
Propeller Pumps
Capacities
1250-216,000
G.P.M.

Sewage and Trash Pumps
Capacities: 50-20,000 G.P.M.



Vertical Angle Flow Pumps
Capacities up to
100,000 G.P.M.



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Straight Chrome in Every Gauge & Size

As stainless users switch to straight chrome types, Ryerson is ready for them. Ready with the nation's largest and most diversified stocks of straight chrome stainless steels.

Our stocks are large because we began building them months ago —when it first became evident that the use of nickel would be restricted. As a result, you can maintain your stainless production now, despite restrictions, by calling Ryerson.

All the straight chrome steels shown on the tags above are on hand in a wide range of gauges and sizes. So we are in a good position to handle almost any requirement. And all are time-tested Allegheny stainless steels of definitely established performance.

If you are looking for a metal to replace nickel-bearing steels, we urge you to consult our stainless specialists. Then draw on our large stocks of straight chrome types. A special technical bulletin on chrome stainless alternates for various applications of 18-8 stainless has just been published. Write for your copy.

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BABBITT METAL

March 31, 1952

WSB: "Joke and Hoax"

The Wage Stabilization Board is a "joke and a hoax." So says Frederick C. Crawford, president of Thompson Products Inc. His opinion of the board is now shared by most metalworking executives, especially after WSB's recommendations in the steel case (p. 45). Public and labor members of the board say they recommend 17½ cents an hour per steelworker, "plus fringe benefits." An analysis shows that actual direct costs mount to 29.8 cents per hour per worker for most steel companies. Republic Steel Corp. figures direct costs for it would total 31 cents and a fully compensating steel price hike would exceed $12 a ton.

If We Get Decontrols

Complete decontrol of carbon steel and aluminum by the fourth quarter is likely—if there's no steel strike (p. 46). In case decontrol plans do go ahead on schedule, what's going to happen to all the defense agencies? One of the first moves may be the merger of Defense Production Administration and National Production Authority. DPA Administrator Manly Fleischmann says, "I think the two should be one."

Capital Outlays Jump

American business plans to spend $24.1 billion in 1952 for new plant and equipment, say the Securities & Exchange Commission and Department of Commerce. That will be 4 per cent higher than the $23.3 billion made for capital outlays in 1951, the record expenditures to date. The largest increase in expenditures is planned by durable goods manufacturers who hope to spend nearly $6 billion in 1952 on new plant and equipment, 16 per cent more than in 1951. Power and gas utilities plan an 8 per cent increase. First half expansion will be greater than in the second six months.

Co-operation

DPA and NPA are co-operating in helping to make possible higher capital outlays by approving construction projects right and left. NPA is giving the green light for 1458 second-quarter industrial projects to cost $7.1 billion. DPA has bestowed its blessings to the power industry's plans to add 32 million kilowatts to its capacity by the end of 1954. The agency has also o.k.'d seven metallurgical coal expansions and seven coke projects which will cost $61.9 million.

No Change at Paulsboro

National Steel Corp.'s proposed steel expansion project at Paulsboro, N. J., (not far from U.S. Steel Corp.'s Morrisville, Pa., job) is still in the engineering-thinking stage. National had the site years before the Korean defense program set in, but many people jumped to the

Production-Engineering News—p. 73 The Market Outlook—p. 133

conclusion that the company was going to do the same thing U.S. Steel did at Morrisville.

Gloomy Outlook for Engineers

The shortage of engineers will get progressively worse, predicts Dr. John T. Rettaliata, president of Illinois Institute of Technology. Last year about 38,000 graduated with engineering degrees, while the demand was for 60,000 to 70,000. By 1954 the number of graduates will slide to 17,000. The situation is leading to high-handed pirating of engineers in some instances. Salary Stabilization Board is starting to investigate that and job-hopping in the major cities.

Go West, Young Man

Watch for more industry migration to the West Coast now that fairly high aircraft production appears assured for some years to come. Some 80 per cent of final aircraft assembly currently occurs in that area. A firm like Babcock & Wilcox Co. today ships about 10 per cent of its mechanical tubing production from Pennsylvania and Ohio plants to the West Coast. That's four times the percentage of sales a decade ago.

No Business Slide Ahead?

Depression? None in sight, says Fred V. Gardner of the management consulting firm, Fred V. Gardner Associates. He bases his conclusions on a U.S. tour, and he aired them before a Material Handling Institute meeting in Chicago. Depression jitters aren't helped by the Labor Department policy of designating certain areas as having "labor surplus." All of the 37 thus far tagged undoubtedly have surpluses, but few probably have marked depression conditions.

Straws in the Wind

The tool business generally is falling off, says Greenfield Tap & Die Corp. . . . An American loan of $1.3 million to a Greek aluminum company will be repaid in the form of 100,000 tons of aluminum for U.S. stockpiles . . . Steep Rock Iron Mines Ltd. says Steep Rock mines in western Ontario, Canada, have a total iron ore potential of at least 1.5 billion tons . . . The Great Lakes shipping season officially opened Mar. 25 with the sailing of two limestone vessels owned by Michigan Limestone Division of U.S. Steel . . . Some 214 cases have now been approved to receive additional controlled materials from NPA's Small Business Hardship Account.

What Industry Is Doing

General Electric Co. is concentrating its major appliance production at Louisville (p. 47) . . . And points to a bright future for home suppliers (p. 47) . . . Steel kitchen cabinet makers are anxious to get at their 90 per cent unsaturated market (p. 48) . . . Alcan (Aluminum Co. of Canada) offers to sell top-quality aluminum forgings in this country (p. 49) . . . Electro-mechanical cutting devices offer the metalworking industry a versatile tool (p. 51) . . . Stretch-out of aircraft production will not hurt most prime and subcontractors in the field over the long run (p. 56).

UNITED

ROLLED THREAD STUDS

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Milled studs are carried in stock from ¼" x 1" to as large as 1¼" x 12". Special milled studs are made to the most exacting specifications and in any desired quantities.

We have extensive facilities to roll thread any special studs you require, from 2-56 thread and larger. Continuous threaded rod can be furnished in any thread diameter up to and including ⅜", and in lengths measured in inches or in feet.

You will find "UNITED" a good source for your requirements.

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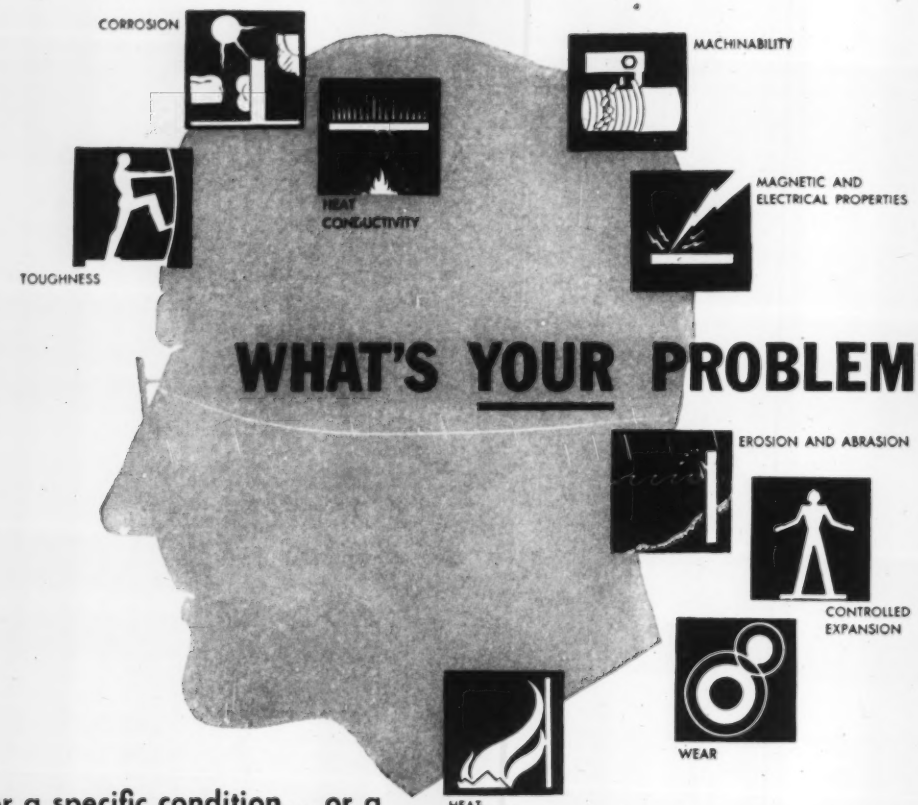

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MECHANICALLY SIMILAR TO GRAY IRON, and resembling austenitic stainless steel in many characteristics, NI-RESIST* provides a unique combination of properties at moderate cost . . .

NI-RESIST has good resistance to corrosive attacks of *acids*, *alkalies* and *salts*. In 5% sulfuric acid, for example, NI-RESIST outlasts cast iron 100 to 1.

WORK-HARDENING CHARACTERISTICS combined with thorough graphite distribution make NI-RESIST ideal for metal-to-metal wear service.

NI-RESIST of normal hardness machines like 200 BHN gray iron and is readily weldable.

NI-RESIST shows up to 10 times better scaling resistance, and up to 12 times better growth resistance than plain iron at temperatures up to 1500° F.

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THERMAL EXPANSION may be controlled from 60% higher than that of plain iron to a low approximating that of Invar.

SEVERAL TYPES OF NI-RESIST are available to meet a variety of industrial demands. Get full information . . . mail coupon now.

At the present time, the bulk of the nickel produced is being diverted to defense. Through application to the appropriate authorities, nickel is obtainable for the production of NI-RESIST for many end uses in defense and defense supporting industries. There are authorized foundries, from coast to coast, equipped to quote you on NI-RESIST castings in all common forms and shapes.

The International Nickel Company, Inc.
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Please send me booklets entitled, "Engineering Properties and Applications of Ni-Resist," and, "Buyers' Guide for Ni-Resist Castings."

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THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N. Y.

Step by Step to Ruin

A major tragedy of the present period of American history is the apathy of the people toward the creeping advance of socialism. For several decades we have been administered homeopathic doses of socialism in such minute amounts that we are not aware of what is taking place.

Two recent events illustrate the distance we have drifted in a short time. One was the blast by President Truman against privately owned electric power companies for their temerity to suggest that expansion in the use of water power in the Niagara district could be carried out by private enterprise more efficiently than by federal operation. He condemned the private companies severely. Not only that, he seeks authority to build steam-electric and hydro-electric plants at many points in the nation.

Throughout Franklin D. Roosevelt's administrations and until a few years ago, government policy was to justify federal power operations only where they are a natural supplement to flood control. Mr. Truman has brushed aside that inhibition. He wants the government to socialize the electric light and power industry.

A second illustration is the Wage Stabilization Board's recommendation of the union shop in the steel wage case. This is a striking departure from the attitude of President Roosevelt in the captive coal mine case in the forties. At that time he declared that the government never would compel a worker to join a union in order to hold a job because "that would be too much like Hitler dictatorship."

Occasionally a strong voice points to the danger of this step-by-step drift to ruin. General of the Army Douglas MacArthur stated the case well in his address at Jackson, Miss., on Mar. 22. These federal policies, he said, "coupled with the rapid centralization of power in the hands of a few, is leading us toward a Communist state with as dreadful certainty as though the leaders of the Kremlin themselves were charting our course. . . . Unless the American people stem the present threatening tide, human liberty will inevitably perish from our land."

Are we too drugged to heed this warning?

E. C. Shaner

EDITOR-IN-CHIEF

SATURATION POINT LOW: In the electric household appliance field a major appliance is one that cannot be carried out of the store by the purchaser. General Electric has surveyed the market for these appliances in future years and its estimates make for pleasant reading. For instance, if the trend of percentage of disposable income spent for major appli-

ances keeps pace with that of the last few years, sales billed by 1960 should be at the annual rate of $4.5 billion, compared with about $3 billion in 1951.

One reason for the rosy outlook is that the saturation points in the markets for numerous major appliances still are low. The market for garbage disposers was only 2.1 per cent saturated at the end of 1951; estimated saturation by 1960 will be 15 per cent. Saturation in 1951 ranges from 1.1 per cent for automatic clothes dryers up to 86.4 per cent for refrigerators. In between, in order from low to high, are dish washers, food freezers, electric water heaters, automatic washers and electric ranges.

General Electric's figures suggest that appliance manufacturing will enhance its position in the metalworking industries during the remainder of this decade.

* * *

THE WARNINGS OF 1913: Merlin Johnson, writing in the *Pathfinder*, reminds readers that when the 16th amendment to the constitution (providing for an income tax) went into effect in 1913, many opponents predicted what would happen. Charles Evans Hughes, then governor of New York, warned that "the federal tax rate might get as high as 10 per cent." Others contended that the right to levy an unlimited tax would give the government power to socialize the nation.

Liberals such as Sen. William E. Borah of Idaho pooh-poohed these fears. Yet what has really happened? Abuse of the income tax principle has brought us to excesses and dangers far beyond the worst fears of anybody in 1913. Today we sorely need a thorough overhauling of our tax structure.

* * *

IS THIS NECESSARY? Last week the House of Representatives passed an appropriations bill for the Department of Labor and affiliated agencies and sent it to the Senate. It appropriated about $211 million for the Department of Labor, a cut of $17 million from the amount proposed by President Truman. It slashed his request for the Federal Security Agency by $181 million. It reduced his figure for the National Labor Relations Board by nearly $1.5 million and the proposal for the Federal Mediation and Conciliation Service by $179,000. No cut was made in the amount requested for the National Mediation Board.

House members deserve credit for the amounts trimmed, yet they voted $1,783,242,968 to run these agencies for the year beginning next July 1. This sum was more than enough to run the entire federal government in every year up to and including 1916. It is also equivalent to a burden of $11 on every man, woman and child in the nation. Is this wanted and is it necessary?

* * *

ECONOMICS SIMPLIFIED: American Economic Foundation, 295 Madison Ave., New York, is issuing four-page illustrated leaflets each month which are designed to afford employees an insight into the fundamentals of economics. The first leaflet, issued in January, is entitled "Capitalism—330,000 B.C." The second, "Why Did It Happen Here?" was issued in February.

This series of economic primers is a by-product of a community-wide economic education program conducted by the foundation in Latrobe, Pa., last year. Interviews by a local newspaper in that city indicate that the economic course was highly successful. Pastors, merchants, machine operators, office workers, union officials, laboratory technicians and men and women in many other occupations testified that "going back to school" was profitable to them in many ways.

This sort of adult education is priceless.

* * *

ACTIVITY IS UP, BUT . . . In spite of decided spottiness in the over-all panorama of business, industrial production continues at a pace that would have been gratifying in previous years. Steel output in the final week of March was estimated by American Iron & Steel Institute at 2,131,000 tons, a new high. Cautious optimism pervades motordom, as increased allotments open the way to higher output. The downward trend in employment in Michigan, which started midyear in 1951, has been reversed. Freight car loadings and electric power distributed—both sensitive indicators of industrial activity—show moderate improvement in the latest week. However, today's indications are meaningless as long as a paralyzing strike in steel is possible. Any realistic appraisal of prospective industrial activity will be academic until the steel wage-price problem has been settled.

Rising Production Requirements and Defense Change-Overs Pose New Problems for Plant Supervision

No doubt about it . . . these are days when a fellow *really* needs a friend! Shop men suddenly find they're up against bigger output quotas. New parts and assemblies have to be fitted into tighter production schedules. Machinery and equipment have to be kept going overtime. Shortages of various grades of steel pose problems, and through it all, NPA priorities and other restrictions produce still more headaches.

Here's Help When You Need it

Yes . . . *practical* help on many problems involving tool, alloy and stainless steels. For example, let's say you're called upon to make a new part from a stainless steel other than the grade you may have worked with before. You may be looking for information on welding, drawing, forming, speeds and feeds, lubrication, etc. It's not as difficult as you may imagine. Your Carpenter representative can often draw upon his experience to help you right on the spot. And if he can't, he can rely on the added experience of many specialists back in the Reading Mill.

Or perhaps, you might have a maintenance headache in keeping machines operating at full capacity to meet higher quotas. Downtime for repairs can be ruinous.

A real "troublemaker"—*Breaking at the rate of 3 to 6 per month, this spindle was ruining production schedules. A Carpenter representative went to work . . . came up with a steel that has kept the job running month after month with no interruptions.*

It was an emergency call—*Production was held up because special studs were breaking almost as fast as they could be replaced in the machine. Could we help them? Since applying the alloy steel recommended by the Carpenter representative the job was fixed so it stayed fixed.*

Here again your Carpenter representative can often recommend an alloy steel that will fix it so it *stays* fixed . . . keep machinery on the job, day after day.

So the next time, when the going gets rough, don't throw up your hands. Here's a service based on a sincere desire to help you . . . a Carpenter Mill-Branch Warehouse service that adds steel specialists to your production and tooling teams at no extra cost. It's backed by all the facilities and know-how of a pioneering Mill Research Laboratory. Next time, try calling your nearby Carpenter Mill-Branch Warehouse. THE CARPENTER STEEL COMPANY, 139 W. Bern St., Reading, Pa.

One call brings all this extra service

DON'T WAIT... COOPERATE!
The U.S. Needs Your Steel Scrap, Now

Carpenter

Mill-Branch Warehouse Service

SPECIALTY TOOL • ALLOY and STAINLESS STEELS

Do you Recognize the Steel Parts Pictured Below?

They represent 9 reasons why you may still have trouble getting Inland Steel

In spite of Inland's record-shattering production year (12 all-time records were broken in 1951), Uncle Sam allocated much of the steel you needed to the Armed Services.

That's why Inland is adding capacity to give you the steel you need.

1. Section of aircraft landing mat
2. Ration cans
3. Frame for army cot
4. Aviation gas truck tank
5. 105 mm. howitzer gun tube
6. Barbed wire entanglement post
7. 5 gallon "Blitz" can for gas or water
8. Forging for 105 mm. shell
9. Fin assembly for 500 lb. cluster bomb

INLAND

INLAND STEEL COMPANY

38 South Dearborn Street • Chicago 3, Illinois

If Steel Goes Up . . .

It would mean cost increases in steel alone on these items

STEEL INCREASE PER TON	AUTO LOW-PRICED	TRACTOR THREE-PLOW	REFRIGERATOR HOUSEHOLD	HOUSE SIX-ROOM
$ 2.50	$ 4.25	$ 2.60	$ .25	$10.60
$ 5.00	$ 8.50	5.20	.50	21.20
$ 7.50	$12.75	7.85	.65	31.80
$10.00	$17.00	10.45	.90	42.40
$12.50	$21.25	13.05	1.15	53.00

You Can't Win in Steel Case

Come what may, the steel dispute will probably leave us with higher prices just as they were beginning to level off. A strike would compound difficulties, postpone decontrols

NO MATTER how the steel case ends now, the final settlement probably won't be good. It will hurt your pocketbook, materials supplies, or both.

So generally unpopular are the Wage Stabilization Board recommendations for settling the steel case (except with labor) that even a government official, Defense Mobilizer Charles E. Wilson, labelled them "a serious threat in our effort to stabilize the economy."

Muddy Waters—Wilson's statement indicates that many public men, too, strongly disapprove of the way the government has muddled the steel case. That muddling has had much to do with bringing management and labor to their present loggerheads.

Although last week the defense mobilizer began trying out his "series of plans" for settling the steel dispute, those plans will probably end up one way: As a pay increase for the steelworkers quite close to WSB recommendations and as a substantial price increase for steel (see the table above). Aroused emotions over the steel case help make a strike distinctly possible when this latest truce extension expires Apr. 8. If we have a strike, the final solution will still be the same: A high wage boost because the WSB recommendations virtually assure it and the substantial price increase because steel companies can't make ends meet with a 20 or 30-cent wage hike and no compensating price rise.

Bad All Ways—In any event we seem doomed to higher steel prices at just the time general prices are levelling off. The wholesale price index of non-farm commodities for the week ended Mar. 18 was 113.2, some 2.9 per cent below what it was in January, 1951. If we have a strike, the difficulties will be compounded because steel supplies will again become short at just the time when decontrol of all carbon products is planned for the fourth quarter. (For more analysis of the effects the steel decision will have on inflation and decontrols, see the following two stories).

The public and labor members of WSB say their wage recommendations amount to 17.5 cents an hour plus fringe benefits. Actually, the immediate cost to steel companies will be 29.8 cents because those fringe benefits are expensive and payroll costs will be higher. Here's the breakdown:

WSB RECOMMENDATIONS	DIRECT INCREASE IN EMPLOYMENT COSTS PER EMPLOYEE HOUR Rate of Increase	Cost of Increase
General Increase in Wage Rates	12.5 cents	14.3 cents
	2.5*	2.9*
	2.5†	2.9†
Six Paid Holidays (including double time for holidays worked)	3.3	3.3
Increased Vacation Benefits (three weeks after 15 years' service)	.6	.7
Increased Shift Differentials (six cents for second, nine for third)	1.2	1.4
Premium Pay for Sunday Work (25 per cent of straight-time rate)	3.69	3.88
Reduction of Southern Wage Differential	.3	.3
Total Direct Cost per Employee		29.8

* Effective July 1, 1952 † Effective January 1, 1953 ‡ Effective January 1, 1953

Still More—Another 30 cents per man per hour can be added to steelmaking costs because of indirect cost hikes that will start coming back to the steel companies in higher charges for supplies and services which they buy once the effect of the steel decision trickles to other segments of the economy.

The United Steelworkers of America-CIO has 2007 agreements, covering 517,506 workers, with companies other than basic steel workers. It says it will insist on the same wage hikes for those members as for basic steel workers. What's more, other unions will look to the steel decision as a goal to be equaled or surpassed and eventually most of the 15 or 16 million organized workers and 46.7 million unorganized will get some kind of wage gains.

Inflation Compounded

WHEN YOU get a steel price increase, you get a cost boost in the fabricated product with compound interest. That's because of the inevitably increased prices of goods and services besides steel needed for the fabricated product.

So, the chart above just represents the inflationary effect of the hike in steel alone. A $5 per ton rise in steel prices would add

Where Allocated Third Quarter Materials Will Go

NPA DIVISIONS	TOTAL STEEL (tons)	TOTAL COPPER (000 lbs)	TOTAL ALUMINUM (000 lbs)
Agr. Mach. & Impl. Div.	549,250	8,850	9,400
Aircraft Div.	20,240	1,780	10,200
Aluminum & Magnesium Div.	——	——	4,300
Building Materials Div.	903,600	57,945	68,000
Canadian Div.	556,500	3,335	1,900
Chemical Div.	260	991	4,750
Communications Div.	41,775	52,720	4,000
Construction Machinery Div.	564,025	7,785	2,300
Consumer Durable Goods Div.	953,269	46,044	77,671
Containers & Packaging Div.	1,540,150	400	24,000
Copper Div.	38,600	3,700	1,500
Electrical Equipment Div.	594,650	168,200	34,000
Electronics Div.	63,525	31,500	12,900
Engine & Turbine Div.	583,000	31,823	3,435
Facilities Bureau			
Construction Controls	90,070	1,970	*
Industrial Expansion	529,500	25,970	9,000
General Components Div.	1,161,750	183,110	22,000
General Ind. Equip. Div.	568,000	45,950	19,000
Iron & Steel Div.	160,150	4,161	110
Leather & Leather Prod. Div.	9,650	1,064	600
Lumber & Wood Prod. Div.	6,008	160	1,050
Metalworking Mach. & Equip.	561,250	29,900	9,950
Mining Mach. & Equip. Div.	135,420	3,555	260
Misc. Metals & Minerals Div.	3,540	2,450	160
Motion Pic.Photo Prod. Div.	6,219	1,162	2,900
Motor Vehicle Div.	3,294,450	120,830	65,625
Ordnance & Shipbuilding Div.	124,975	11,175	1,500
Printing & Publishing Div.	5,520	1,160	640
Pulp, Paper & Paperboard Div.	850	65	100
Railroad Equip. Div.	1,773,373	85,950	4,970
Rubber Div.	28,338	3,610	950
Scientific & Tech. Equip. Div.	51,745	41,700	13,400
Service Equip. Div.	40,450	2,685	3,720
Water Resources	230,089	2,800	200
NPA—(Ex. Reserves) TOTAL	15,190,191	984,500	414,491

* Included with Industrial Expansion

GENERAL CLAIMANTS	TOTAL STEEL (tons)	TOTAL COPPER (000 lbs)	TOTAL ALUMINUM (000 lbs)
Agriculture, Dept. of	47,010	1,085	45
Army, Dept. of	36,425	1,510	90
Atomic Energy Commission	106,603	6,404	5,804
Civil Aeronautics Admin.	25,317	1,432	515
Defense, Dept. of	2,394,945	261,823	228,739
Defense Electric Power Admin.	296,025	62,250	61,300
Defense Fisheries Admin.	509	25	4
Defense Materials Proc. Agency	50,750	2,100	250
Defense Solid Fuels Admin.			
Coal Mine Construction	13,050	355	25
Coke Oven Construction	26,180	410	5
Defense Transport Admin.	90,240	2,684	150
Federal Civil Defense Admin.	15,000	60	20
Federal Security Agency			
Education	145,060	5,420	200
Hospitals	75,625	3,025	170
General Services Admin.	25,145	3,470	100
Housing and Home Finance Agency	95,000	3,320	100
Interior, Dept. of	5,718	148	25
Maritime Admin.	128,875	2,020	150
OIT-MSA	951,500	10,360	2,000
Petroleum Admin. for Defense	1,903,750	9,050	1,500
Public Roads, Bureau of	352,000	610	200
Veterans Admin.	8,817	1,275	55
GENERAL CLAIMANTS—TOTAL	6,793,544	378,836	301,447
NPA—(Ex. Reserves) TOTAL	15,190,191	984,500	414,491
NPA Reserves (General)	125,000	11,000	15,000
NPA Reserves (Hardship Cases)	55,000	4,000	3,000
NPA—Field Case Account	810,630	28,052	18,000
DPA—Total Reserve Set Asides	2,434,995	105,408	51,213
GRAND TOTALS	25,409,360	1,511,796	803,151
SUPPLY	21,611,800	1,301,000	710,000
% OF SUPPLY	117.6	116.2	113.1

$8.50 immediately to the cost of a car in the Chevrolet-Ford-Plymouth class, eventually it would mean a $50 increase.

The tractor listed in the chart also uses 624 pounds of gray iron castings and 113 pounds of steel castings. Costs there will also rise if pig iron increases, as it might.

What happens when a steel price hike goes into effect eventually shows in the consumers' price index. When steel prices went up in December, 1949, the index stood at 168.8 of the 1935-1939 average. Within one year it rose to 178.8. At that time, December, 1950, another steel increase came in and within one year the index rose to 189.1. All that increase in the index can't be laid to steel, but the increase in its quotations was a strong inflationary push.

Decontrols by Yearend?

IF THERE'S no steel strike, complete decontrol of carbon steel and aluminum may come in the fourth quarter this year or certainly in the first quarter of 1953. If there's a long steel strike, we're stuck with rigid controls for a year at least.

The aluminum supply situation hinges on what happens in steel because much of the aluminum industry is unionized by United Steelworkers who say they'll do in basic aluminum what they'll do in basic steel.

Getting Set—DPA and NPA now are engaged in devising a system which will insure that in the decontrol period maximum requirements of the armed services and the Atomic Energy Commission will be met. NPA should be ready to reinstitute a priority system quite similar to that existing late in 1950 and 1951 before CMP was adopted. The use of priority ratings would be restricted to direct military and AEC requirements. No ratings whatever would be applicable to defense support needs.

Controls will be markedly relaxed even in the third quarter. The listings above are especially lenient for consumer durable goods which will get 37 per cent more aluminum than in the second quarter, 19 per cent more copper products and 15 per cent more steel. Except for the consumer durable classification, the revised second quarter allotments closely parallel the third-quarter listings.

The Breakdown—Allocations are provided for the production of 1,050,000 autos during the third quarter, 24,939 freight cars, heavy petroleum expansion. The third-quarter allocations will make it possible to meet the construction requirements of all basic mineral programs, as well as all building for the Department of Defense and electric power. In industrial expansion and commercial construction, allocations have been made to carry forward all projects which received allocations in the second quarter. Some structural steel will be available for new starts in the period, as determined by NPA's Facilities & Construction Bureau. Enough allocations have been provided to carry forward all road jobs that had earlier o.k.s or were started before controls began—if there's no steel strike.

GE MAJOR APPLIANCE SUPPLIERS GET A LOOK AT NEW SETUP
. . . multimillion-dollar Louisville plant may alter pattern of buying

Watch GE; It's Revamping Its Appliance Setup

IN CHARTING your course of business for the next several years it may pay you to notice the move General Electric Co. is making.

It has begun to concentrate its production of major appliances at a new multimillion-dollar manufacturing center near Louisville. This will change the company's pattern of buying for its major appliance division.

Some of the present suppliers to the division will drop out of the picture, either because they will be at a geographical and freight disadvantage or because GE chooses to produce the components. The effects of these changes will not stop with the suppliers of components; they will stem clear back to those supplying materials to the components makers.

New Opportunities—On the other hand, new business opportunities will open up for vendors not now serving the appliance division but who could compete for business in Louisville. Furthermore, GE expects that its appliance business will grow enough that by 1960 its annual purchases of materials and components for appliances will be $50 million greater that in 1951.

New business opportunities with GE will not be limited to the Louisville operations. There'll be some in the eight cities from which GE appliance production will be moved. It is expected that the plants vacated will be occupied by other GE divisions that are expanding. While there'll be a change of needs at these plants there will be a need for materials and components.

A Big Hit—To inform suppliers about the change in its appliance setup, GE invited them to a conference and exhibit at Louisville. It expected 400 to 500 present and potential vendors to show up; 750 appeared.

GE's new appliance setup will be known as Appliance Park and will be located on a thousand-acre tract at Buechel, on the southeast outskirts of Louisville. One hundred of these acres will be under roof, and 400 acres in active use.

Plans call for five manufacturing buildings, a warehouse, administration building, personnel building, laboratory and research facilities and maintenance facilities. When completed, Appliance Park will have the capacity to produce one major appliance every 4.5 seconds. A major appliance is one you can't carry out of a store.

Production Schedule — Initial production of appliances is expected to begin late this year at Appliance Park. First to be made there probably will be electric dishwashers, room coolers and automatic clothes washers and dryers. Production of ranges is scheduled for next year.

GE selected the Louisville area for three reasons: It is near the center of distribution of its major appliances. It has an adequate labor supply. It has superior transportation facilities, including water transport for sheet steel.

Big Consumer — When in full operation, Appliance Park will take in 90 carloads of material a day.

Five departments make up GE's major appliance division: Range and water heater; electric sink and cabinet; home laundry equipment; household refrigerator; and room cooler. In general, each of these departments will purchase materials and components to take care of its own production requirements. Where similar materials and possibilities of standardization make it advantageous to consolidate purchases, they will be co-ordinated by the materials and purchasing department of the major appliance division. Heading the materials and purchasing department in Louisville is Clayton P. Fisher Jr.

Last year GE had business relations with 1500 suppliers. More than half of the dollars GE receives for major appliances are paid out for materials and parts.

Business Tip

Growth in major home appliance business promises great opportunities for suppliers

GREAT OPPORTUNITY for suppliers lies ahead in the appliance field.

You can draw that conclusion from an estimate of the future by C. H. Linder, general manager, General Electric Co.'s major appliance division, Louisville.

"Sales billed by the major appliance industry in 1951 approximated $3 billion. If the trend of percentage of disposable income spent for major appliances keeps pace with that of the last few years, we expect that annual sales billed probably will approximate $4.5 billion a year by 1960," says Mr. Linder.

The appliance market growth, he points out, is predicated upon normal population growth, estab-

lishment of new family units and homes, continued inflationary pressures and social changes in which electric appliances will become more important in daily living.

In looking into the future Mr Linder compares percentages of market saturation for 1951 with those estimated for 1960 and appliance unit production in 1951 with estimates for 1960.

Here's how Mr. Linder looks at the market for major appliances:

Refrigerators — At the end of 1951, the market was 86.4 per cent saturated. A saturation of 95 per cent will be reached by 1961. Refrigerator sales in 1951 totaled 3.9 million units. Annual sales are expected to remain at about present levels. Sales for the most part will represent replacements. A high level of refrigeration business will be possible through introduction of new technology, features and appearance which will render older refrigerators obsolete.

Automatic Washers — Market saturation in 1951, 12.8 per cent; estimated 1960 saturation, 39 per cent. Sales in 1951, 1,550,000 units; estimated 1960 sales, 2.6 million.

Automatic Clothes Dryers—Market saturation in 1951, 1.1 per cent; estimated 1960 saturation, 16.9 per cent. Sales in 1951, 350,000 units; estimated 1960 sales, 1.2 million.

Electric Ranges—Market saturation in 1951, 21 per cent; estimated 1960 saturation, 43 per cent. Sales in 1951, 1.4 million units; estimated 1960 sales, 2.2 million.

Electric Water Heaters—Market saturation in 1951, 11.6 per cent; estimated 1960 saturation, 24 per cent. Sales in 1951, 845,000 units; sales in 1960 are estimated at 1.8 million units.

Food Freezers — Market saturation in 1951, 5.8 per cent; estimated 1960 saturation, 24.6 per cent. Sales in 1951, 1 million units; estimated 1960 sales, 1.1 million units.

Dishwashers—Market saturation in 1951, 2 per cent; estimated 1960 saturation, 12 per cent. Sales in 1951, 260,000 units; estimated 1960 sales, 1 million.

Garbage Disposers—Market saturation in 1951, 2.1 per cent; estimated 1960 saturation, 15 per cent. Sales in 1951, 335,000 units; estimated 1960 sales, 1,250,000 units.

Uncle Sam's Tanks Get the Brush-off

Power brushes are kept busy when Uncle Sam decides to recondition such equipment as these 36-ton Army high speed tractors. The tanks are covered with rust, dirt and paint which must be removed before they can be overhauled and put back into service. Wire brushes, made by Osborn Mfg. Co., Cleveland, mounted on portable air tools do the job easily and quickly

Steel Cabinet Industry Champs at the Bit

STEEL KITCHEN cabinet makers are formulating plans and gathering information with which they hope to put a big dent in wood — their chief competition in the household cabinet field.

While CMP and building restrictions sit heavily on current production figures, individual manufacturers are keeping production lines open, perfecting machine operations for steel cabinet making and reaching for all the materials they can get. When the green light of eased controls comes on, they expect to sally forth into a 90 per cent unsaturated market.

Freeing from Fetters—Lack of specific and detailed sales and marketing information has hampered steel kitchen cabinet sales managers in the past. Overcoming that deficiency is one purpose of the industry's new trade association, the Steel Kitchen Cabinet Manufacturers Association.

Arthur J. Tuscany, executive secretary of the SKCMA, reports committees have been formed on such activities as packaging, standardization, sales and advertising and trade statistics. Work is slanted toward the day when there'll be more cabinets than customers and "intensive selling" will be the order of the day.

How It Goes—Modernization now accounts for 70 per cent of the steel cabinet business as against 30 per cent for new building installations. Residential homes are the biggest single market, though hospitals, apartments and industrial applications are becoming more and more common. As one man in the industry puts it, "Once a building contractor has used steel cabinets, he's a customer for the rest of his life."

The industry did about $120 million worth of business in 1951, selling about 2.7 million cabinets. In 1950, they sold 2.9 million cabinets, with a value of about $126 million.

There are perhaps 40 firms in the steel kitchen cabinet industry, with the 20 firms which are members of the Steel Kitchen Cabinet Manufacturers Association accounting for 90 to 95 per cent of the output. Smaller firms find the pace difficult to maintain as the trend is away from handmade cabinets and toward completed machine-made, production-line models.

Canadian Aluminum Invades U. S.

Forgings offered by Alcan. Does this herald an intensive campaign to sell other fabricated forms of aluminum to U. S. metalworking plants?

A DIRECT BID for business in the United States fabricated aluminum market is being made by the Aluminum Co. of Canada Ltd. (commonly known as Alcan).

This move will probably be viewed two ways: 1. With satisfaction by some United States users of fabricated aluminum. 2. With alarm by United States fabricators of aluminum and producers of primary aluminum.

In several business publications the Aluminum Import Corp., 630 Fifth Ave., New York, is advertising its offer to supply top-quality aluminum forgings to U. S. manufacturers. That corporation is the distributing company in the Western Hemisphere for Aluminium Ltd., owner of Alcan and numerous other subsidiaries. Aluminium Ltd. and Alcan both have their home offices in Montreal, Que.

World-Wide — Alcan has long been an integrated producer and fabricator of aluminum and is closely affiliated, through Aluminium Ltd., its parent company, with fabricating companies throughout the world.

Alcan or its many affiliates manufacture and sell a complete range of fabricated aluminum products. Their capacity, it is said, is in excess of 550 million pounds of fabricated aluminum products a year.

Alcan's bid for aluminum forgings business has raised this question: When will Alcan and its affiliates launch an intensive campaign through the Aluminum Import Corp. in competition with United States fabricators to sell in the United States the following products in large quantities?

Foil or sheet—Fabricated in Canada, Great Britain, Japan, Germany, Mexico, Switzerland, Norway, Brazil, Australia, Holland, South Africa and India.

Extrusions—Fabricated in Canada, Great Britain, Holland and Australia.

Castings—Fabricated in Canada, Great Britain, Germany, Australia and Norway.

Cable or wire — Fabricated in Canada and Great Britain.

Utensils—Fabricated in Canada, Germany, India, Brazil, Denmark and Norway.

Formidable—Canadian aluminum has been viewed as a strong competitor to U. S. aluminum (STEEL, Feb. 4, 1952, p. 71). Aluminium Ltd. is accepted as the lowest-cost producer of ingot. Most of the foreign fabricated aluminum taking an increasing share of the domestic market away from U. S. fabricators is made by Alcan or its affiliates, or their Canadian and European customers. This fabricated aluminum is reaching U. S. markets in increasingly large quantities.

In 1951, U. S. imports of fabricated aluminum (sheets, bars, etc.) totaled 38 million pounds, compared with 21 million pounds in 1950. This is an 81 per cent increase. Meanwhile, raw aluminum (ingot and scrap) imports into the U. S. dropped from 489 million pounds in 1950 to 278 million pounds in 1951, a 43 per cent decrease.

Alcan granted the British government's Ministry of Supply first call on 440 million pounds of its annual output this year and next, and on 551 million pounds annually thereafter. A large part of the Alcan metal being taken is said to be undergoing fabrication in British plants and used in Britain's export drive for dollars.

Titanium Looks Good to Crane

Crane Co.'s explorations in the titanium field will be extended to cover the entire scope of the process from developing ore reserves to turning out the finished metal, says J. L. Holloway, president.

A pilot plant for experimental titanium production (STEEL, Dec. 10, 1951, p. 64) has been in operation for a number of months. Improvements which the firm feels are significant have been made over known processes for producing the metal, leading the firm to continue and extend its program.

Should current exploratory and development work indicate the feasibility of such a move, Crane Co. plans to enter the titanium field as a primary producer of the metal. The industrial valve maker has already entered the aviation field as makers of aircraft valves and accessories under a diversification program.

Translucent Transom

Corrugated acrylic plastic is replacing wired glass in the skylights at the Crown Can Co. Philadelphia plant. Translucent Plexiglass, says the company, prevents danger of breakage and leakage and diffuses light more evenly and with less glare than glass. The plastic sheets measure 28 x 60 inches and are installed on the same connecting strips used for the glass

Faster Pace for Iron

Blast furnace production in February was at a higher daily rate than in January, but the shorter month of February netted a little less tonnage than January.

February output totaled 5,784,602 net tons, the American Iron & Steel Institute reports. January production was 6,039,591 tons. February's daily rate was approximately 199,000 tons, compared with January's 195,000 tons. In February, furnaces operated at 99 per cent of capacity. Additional details follow:

1952	Pig Iron	Ferromanganese and Spiegel	Total Blast Furnace Output
January	5,979,227	60,364	6,039,591
February	5,722,673	61,929	5,784,602
1951			
January	5,829,094	65,309	5,894,403
February	5,117,603	58,731	5,176,334

"Army Work Horses" Ain't What They Used To Be—They're Better

Ready for action are these new GMC 6 by 6 military trucks. Featured on the newly designed models are Hydramatic drive with eight speeds forward and two in reverse, a new engine developing 145 horsepower, "Snorkel" devices for traveling submerged in water and new, softer riding springs. GMC Truck and Coach Division Plant at Pontiac, Mich., built more than one-half million of the famed trucks during World War II.

Hardship Areas Get Ways and Means for Contracts

MANUFACTURERS in labor surplus areas are definitely slated to get relief. Regulations approved by the Munitions Board cover negotiated contracts valued at $25,000 and over. Here's what the regulations mean:

Procurement officers may reveal the lowest bid to manufacturers in hardship areas, if the lowest bid is submitted by a manufacturer in an area not having a labor surplus. Then, the manufacturers in high unemployment areas may negotiate their bids downward. Also, late bids may be accepted in the initial solicitation of proposals if the officer is able to avoid an unreasonable time-loss in procurement.

The new regulations do not alter the present method of awarding advertised contracts, except for "set-asides." When "set-asides" are used, the procurement officer invites bids for the quantity that would probably yield the most favorable prices. They may negotiate with manufacturers in hardship areas at prices equal to the lowest qualified bid received.

In 1951, the government procured 93 per cent of its military supplies through negotiating; only 7 per cent of military supplies were bought through advertising methods.

Among the areas designated by the government as locations of labor surplus are: New York City; Detroit and Flint, Mich.; Asheville, N. C.; and Providence, R. I.

See the accompanying table for selected metalworking contracts awarded by the government in excess of $250,000 in value.

PRODUCT	CONTRACTOR
Fire Truck Pumps	Howe Fire Apparatus Co., Anderson, Ind.
Shells, 105 mm	Lehigh Foundries, Inc., Easton, Pa.
Cartridge Cases	Regal Ware, Inc., Kewaskum, Wisc.
Casing Bursters	Automatic Steel Products Co., Canton, O.
Gun Parts	American Car & Foundry Co., New York
Carriages for Howitzers	American Car & Foundry Co., New York
Machines	Hires, Castner & Harris, Inc., Philadelphia
Rebuilt Engines	Bowen & McLaughlin, Phoenix, Ariz.
Metal Drums	Rheem Mfg. Co., New York
Aircraft Generators	Phaostron Co., S. Pasadena, Calif.
Altimeters	Buescher Band Instrument Co., Elkhart, Ind.
Ballistic Computers	Northrop Aircraft, Inc., Hawthorne, Calif.
Aircraft	Beech Aircraft Corp., Wichita, Kansas
Steel Boats, Passenger	Higgins, Inc., New Orleans
Steel Harbor Tugs	National Steel & Shipbuilding Corp., San Diego, Calif.
Teletype Reperforators	Teletype Corp., Western Electric Co., Chicago
Radio Sets	Radio Corp. of America, New York
	Admiral Corp., Chicago
	Zenith Radio Corp., Chicago
Antenna Equipment	Precision Associates, Brooklyn, N. Y.
Radio Transmitters	Federal Television Co., New York
	Eastern Electric, Inc., New Bedford, Mass.
Inverters	Leland Electric Co., Dayton, O.
Fluoroscopic Units	Westinghouse Electric Corp., Pittsburgh
Dental Operating Units	Ritter Co., Inc., Rochester, N. Y.

Salary Board Formalizes Steps

Office of Salary Stabilization, through its Salary Procedural Regulation No. 1, has formalized the steps for employers seeking salary adjustments for employees who are under the jurisdiction of the Salary Stabilization Board. Procedures for reconsideration and appeal of OSS determinations is fixed by the same regulation.

After Apr. 1, 1952, applications for salary adjustments must be filed on OSS form No. 300 which may be obtained from regional OSS offices or local Wage and Hour offices, as well as the Office of Salary Stabilization in Washington, D. C. A determination will be final unless the employer files a request for reconsideration. If, after reconsideration, the employer is not satisfied with the salary adjustment allowed, he can appeal the OSS decision to the Review and Appeals Committee. This committee will be composed of three members. Its decision will be final.

Regional offices of OSS are being opened in New York, Boston, Detroit, Philadelphia, Cleveland and San Francisco. Eventually these regional offices will administer all policies of the board and reconsiderations, except in a few types of cases which will still be reconsidered in Washington.

As of Mar. 7, 1952, the OSS had a backlog of 5400 applications and 1000 new plant reports.

CHECKLIST ON CONTROLS

GOVERNMENT control orders are digested or listed each week in this "Checklist on Controls." For complete copies of NPA orders, write to NPA Distribution Section, First Basement, New GAO Bldg., Washington 25. For copies of OPS orders, contact nearest OPS district or regional office. For copies of OPS news releases, write David S. Phillips, director, OPS Administrative Services Division, Temporary E Bldg., Washington 25.

Controlled Materials Plan

DELIVERIES—Amendment of Mar. 21, 1952, of CMP Regulation 4 permits users of controlled materials to receive them from distributors 15 days prior to the quarter for which the user's allotment is valid. The amendment was effective Mar. 21.

STAINLESS STEEL — Amendment of Mar. 21, 1952, of Direction 9 to CMP Regulation 1 permits authorized controlled materials orders for non-nickel-bearing stainless steel, which were outstanding on Jan. 28, 1952, when such steel became a non-controlled material, to be converted to delivery orders bearing a DO rating. This continues the preferential status of authorized controlled materials orders outstanding on Jan. 28 and avoids delivery confusion between new orders bearing DO ratings and previously accepted orders.

Materials Orders

STEEL STRAPPING—NPA Order M-59, which controlled the use and inventory of steel strapping was revoked Mar. 25, 1952, because of ample supplies of strapping. Steel strapping will remain subject to inventory limitations of NPA Regulation 1.

FERROALLOYS—Amendment of Mar. 24, 1952, of Schedule A of NPA Order M-80 adds to the list of products in which the use of nickel-bearing stainless steel, high nickel alloy steel and nickel silver is prohibited on and after Apr. 1, 1952.

Price Regulation

PRICE ADJUSTMENTS—Amendment 1 to General Overriding Regulation 21 permits manufacturers of replacement parts for items covered by the manufacturers' ceiling price regulation, CPR 22 to apply to the Office of Price Stabilization for permission to determine Capehart ceiling price adjustments in accordance with the procedure provided under Supplementary Regulation 17 to CPR 22. The amendment was effective Mar. 29, 1952.

Darby Heads NPA Division

J. D. Darby, vice president of sales, United States Steel Co., assumed the duty of director of the Iron and Steel Division, National Production Administration, on Mar. 25. Mr. Darby, on leave of absence from U. S. Steel, was formerly deputy director of the division. M. B. McCafferty, on leave from Wheeling Steel Corp., is expected to fill the job of deputy director

Tool Builders Consider Broadening Their Lines

WIDER carbide uses and a short diamond bort supply that has little chance of improving are spurring developments in a variety of electro-mechanical machines that may in time become important additions to metalworking plants.

Several machine tool builders are considering adding the devices to their lines because of greater versatility in the units resulting from technical advances. Once suitable only for roughing out and tap removal work, they now are capable of fine finishing operations.

License—Recently concluded is a licensing arrangement between Cincinnati Milling Machine Co., Cincinnati, and Elox Corp., Clawson, Mich., whereby the machine tool builder will develop and build equipment for precision work. Elox will supply the electronic drills and related equipment. About six months to a year of engineering and development time will be necessary before the first units are available for commercial use. This unit uses pulsating direct current and operates on the electro-arc principle.

Similar in many operating principles is the machine built by Method X Co., affiliate of Firth Sterling Steel & Carbide Corp., Pittsburgh. Since Firth Sterling isn't a machine tool builder it is considering the possibility of a licensing or similar arrangement with some machine tool builder. In this manner the machine tool builder's engineering know-how and experience gained in helping tool up thousands of customers would make an invaluable tie-in with the knowledge of the electronic principles involved.

New Uses — Warner Division, Clinton Machine Co., Detroit, traces its beginning in this field to salvage operations but now finds that many other operations are well suited to its disintegrator line. Doing similar work in electrolytic processes is United Drill & Tool Corp., Chicago; Cavitron Equipment Co., New York, is developing an ultrasonic technique.

Some metalworking operations within the scope of these new techniques are: Sharpening single point tools, grinding single point tool chip breakers, sharpening milling cutters and broaches, forming cemented carbide turbine bucket attachments, grinding titanium compressor disks and rifling gun barrels.

DPA OKs Necessity Certificates

Certificates of necessity for accelerated tax amortization of 587 new or expanded defense facilities, involving the proposed investment of $958 million were approved by DPA from Feb. 16 to Feb. 29.

Among the largest certificates approved were those of: North American Steel Co., Clinton, Iowa, to write off 85 per cent of $66.5 million; Cleveland Electric Illuminating Co., Eastlake Village, O., to write off 40 per cent of $19 million and 50 per cent of $36 million; Public Service Electric and Gas Co., Newark, N. J., to write off 55 per cent of $20 million and 45 per cent of $24 million; Southern California Edison Co., Los Angeles, to write off 40 per cent of $35 million; New York State Electric and Gas Corp., Binghamton, N. Y., to write off 45 per cent of $17 million; and Union Carbide & Carbon Corp., Marietta, O., to write off 65 per cent of $16 million.

DPA points out that almost half of the certificates approved involved $100,000 or less and that such applications are being given special consideration to encourage small defense plant expansion.

Windows of Washington

By E. C. KREUTZBERG *Washington Editor*

WEAPONS DESIGN CHANGES
. . . industry suggestions welcome

UNEMPLOYMENT STUDIED
. . . leaner times ahead?

CODE REFERENCE: BRICKBAT
. . . expedites involved talk

SHIP SALVAGERS WANTED
. . . sales have no takers

TO WHAT EXTENT can the responsibility of designing weapons be shifted to the shoulders of industry—meaning chiefly the contractors who make these weapons?

"We have had two or three instances of designs and specifications put out for bids where the contracting industry has suggested changes which would materially reduce the cost," says Defense Secretary Robert A. Lovett.

Familiar Air — Manufacturers, he says, are familiar with the art of combining design and process engineering so as to turn out a product fully desirable and comparatively low in cost. The technical services in his department, says Mr. Lovett, "do not and cannot have the amount of production engineering experiences which the present level of prices seems to me to make absolutely essential.

"So methods are in sight which will make it possible to get the benefit of the best industrial design and the process engineering competence without the waste in time and money we have experienced in the past."

Elbow Room—As a principal step toward this end, contractors are to be permitted to quote alternate prices for their own design suggestions on end items. In addition, "sound and substantial contractors" are to be allowed more "elbow room" in managing their contracts. Details of the new procedure are being formulated and will be announced shortly.

Cheaper To Work?

Statutory structure of unemployment compensation is being readied for possible leaner times ahead. The Unemployment Insurance Subcommittee, House Ways & Means Committee, starts hearings this week on these bills:

H. R. 3391, to extend coverage of the Federal Unemployment Tax Act to employers having one or more employees.

H. R. 4133, extending financial aid to the states in administering unemployment compensation laws and operating public employment offices.

H. R. 6174, to provide more unemployment compensation benefits to workers unemployed during national emergency period.

H. R. 6954, providing for payments to state unemployment funds.

And a new bill to grant unemployment benefits to veterans upon release from the armed services.

Of most immediate interest to employers is H. R. 6174, the Dingle-Moody bill which would call on the federal government to pay additional compensation to workers out of employment because of the defense program. Net effect would be to pay the unemployed worker a total of 65 per cent of his weekly wages.

Reference Gibberish . . .

Always resourceful in evolving code identifications which on their face have not the remotest relationship to their significance, the Defense Department's latest achievement in this respect is the word "Brickbat."

In interoffice communications it uses the term "Reference: Brickbat" when it means that the program referred to in the letter is on the department's list of critical items which have top priority and whose production requires utmost expedition. That saves a lot of wordage in letters and telephone conversations. There are some additional code names which cover items of lesser priority—but the department won't disclose these now.

In the Drink . . .

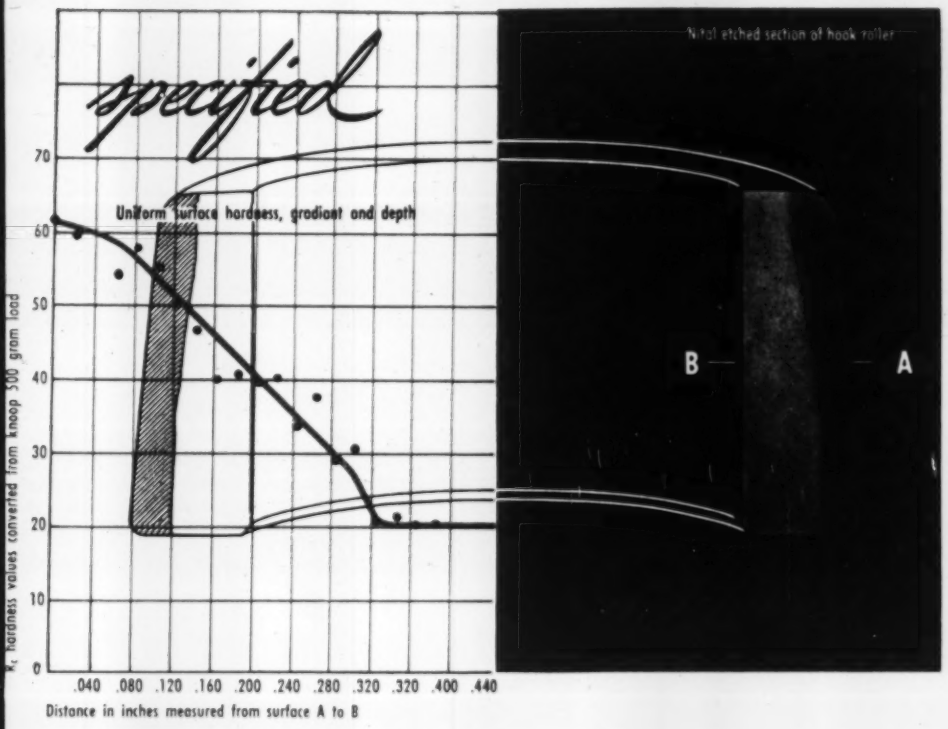
What is to be done about salvaging sunken vessels? This question is a headache for the Maritime Commission which three times has advertised for bids. On one occasion no bids were received; on the two others the bids were unsatisfactory.

Not counting ships sunken in the Pacific and elsewhere in the world, the MC has some 125 sunken ships on the United States continental coastline which it is eager to sell. These contain an estimated 300,000 to 325,000 tons of scrap as well as salvageable marine parts and cargo.

Expeditious Manner . . .

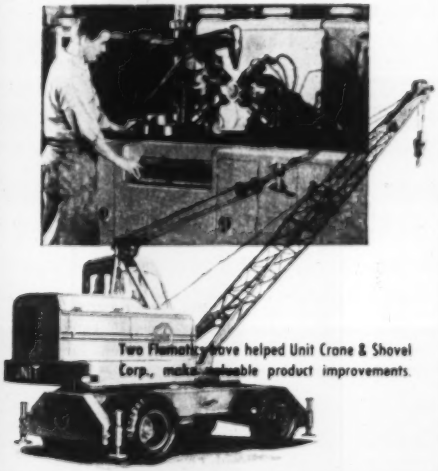
Consumers who contribute 30 cents to the United Mine Workers Welfare and Retirement Fund every time they buy a ton of coal can derive satisfaction from the businesslike and expeditious manner in which that money goes toward this objective.

Last December the Fund's managers announced a decision to build 10 hospitals for miners working where suitable hospital facilities were lacking. Now the Fund has placed contracts with architects and acquired the sites in West Virginia and Kentucky. Construction will be pushed and the new hospitals, with a total of about 1000 beds, should be ready for service before the end of this year.



by flamatic selective surface hardening

Flamatic set up for hardening hook roller



Two Flamatic groove helped Unit Crane & Shovel Corp., make valuable product improvements.

The etched section and the graph plotting Rockwell "C" hardness vs. distance from the surface of this 5" OD hook roller, Flamatic-hardened, are convincing proof of Flamatic performance. Material: AISI-8750 steel tubing. Production rate: 30 parts per hour. Distortion: so low that no machining is required after heat treatment. Flamatic hardens many other parts, and customer says, "We can very definitely state that our product has greatly improved since this (Flamatic) installation was made, particularly with reference to the extended life of a 16" drum gear . . . the life of which has been extended 50%."

Flamatic hardening uses high temperature flames and exclusive electronic temperature control which enable you virtually to **blueprint the desired hardness pattern** (on parts up to 18" OD or shafts up to 24" long) and **get what you want** automatically, uniformly, with exceptional economy. Write today for M-1724 or better still, send in your parts for analysis and quotation.

flamatic

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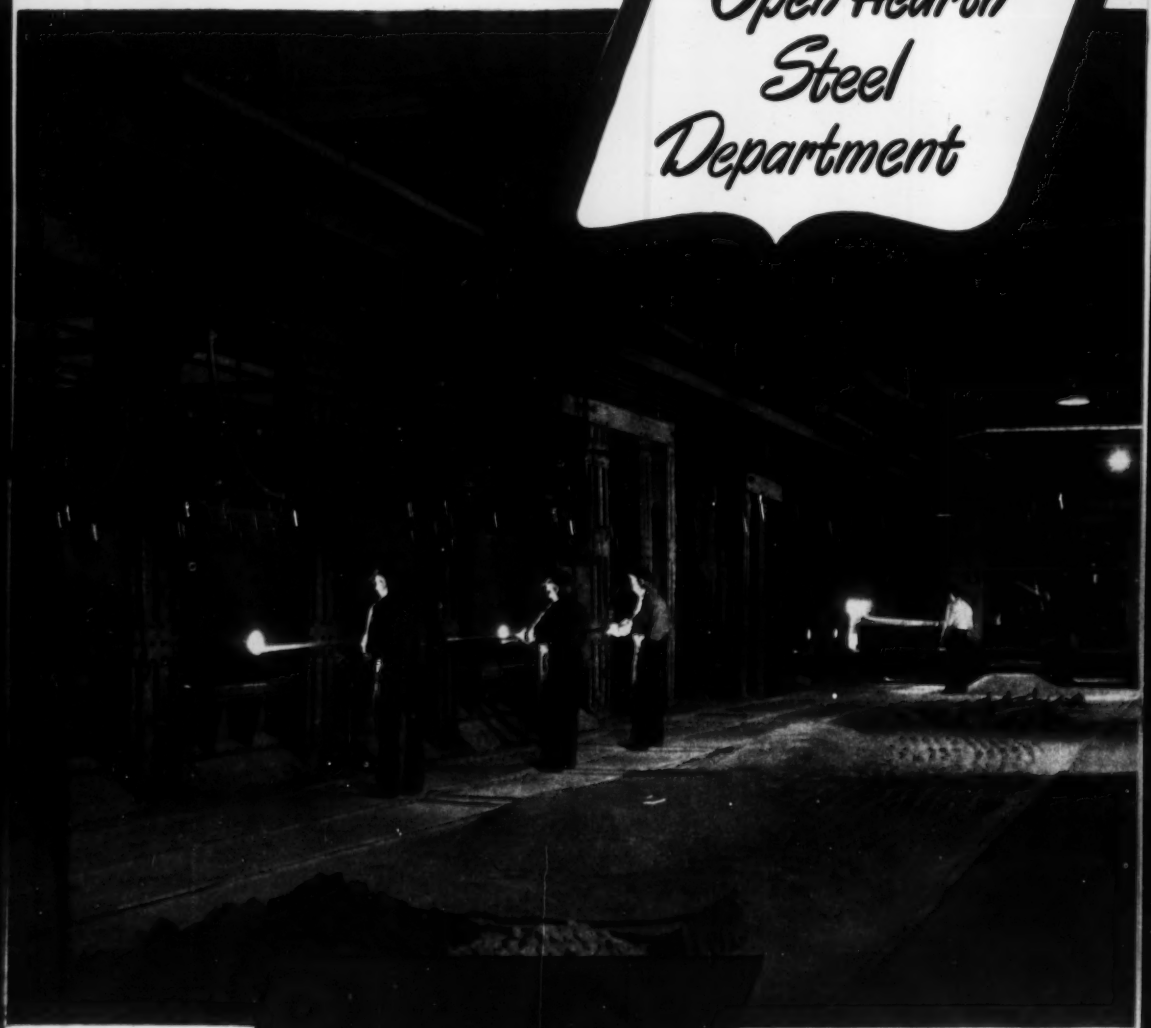
CINCINNATI

Open Hearth Steel Department

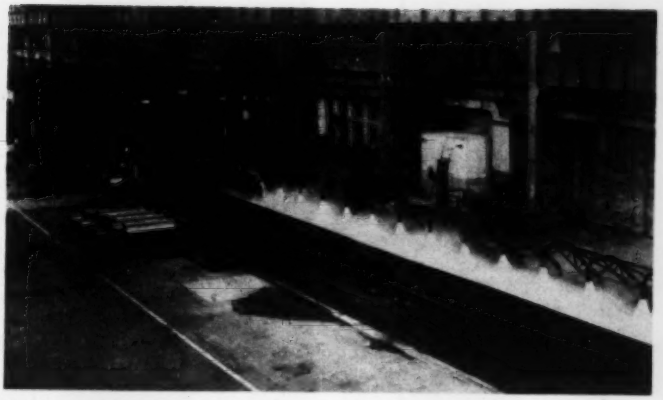


Working a heat of high quality steel in the Mesta Open Hearth Department.

Designers and Builders of Complete Steel Plants

MESTA MACHINE COMPANY

PITTSBURGH, PENNSYLVANIA



Abbey Works Rolls on Part-time Basis

Finishing stands and runout table, with its high pressure water jets, are working on a shortened workweek at the Abbey Works, Steel Co. of Wales Ltd., in England. Lack of semi-finished steel is forcing the slowdown despite congested order books. Limiting basic steel production are scrap and coke supplies

Time's Ripe for American Firms Abroad

Deflating dollar returns from exports are prompting many American firms to open foreign branch plants and license firms to make and sell American products 'over there'

FOREIGN BRANCH plants, subsidiaries or licensed firms are permitting some American manufacturers to maintain their foreign markets despite trade barriers, dollar scarcities and political unrest. They may someday prove to be anchors to the windward for periods of slack business in this country.

As I. F. Baker, vice president of Westinghouse Electric International Co., puts it " . . . when things start to tighten at home, the sales that the export sales manager or the head of the international division of a company can report are extremely welcome."

Many companies are finding that to hold onto their foreign markets they must set up factories within soft currency areas, the sterling countries for example. Foreign competitors are getting stronger and Marshall Plan funds no longer assure plenty of customers with the means to buy in hard money.

Delayed Depression—Time lags in business depressants may result in domestic business being off while foreign operations continue to grow and show profits, according to G. F. Clipsham, assistant to the president, Lincoln Electric Co., Cleveland. Lincoln Electric has subsidiaries in Canada and Australia and part interest in a firm in England.

N. C. Rubin, vice president in charge of sales, Yoder Co., Cleveland, says the time is not only ripe for American concerns to invest in foreign branches, "it's over ripe." If an American firm is considering such a step they had better do it quickly. Yoder Co. has two licensees, one in Sweden, one in Germany, and one branch plant, SOMENOR, at Creil, France. They're all showing profits.

Well known European manufacturers, in particular, are stepping up their drive for overseas markets. So, it will take considerable American selling effort, in time and money, to establish a market for a completely unknown product in foreign markets.

Deterrents — Working against American manufacturers wishing to open foreign branches are restrictions on withdrawal of profits from foreign enterprise and U.S. taxes on such profits which are brought in.

Machine To Be English-made

Barry-Wehmiller Machinery Co. Inc., St. Louis, food and beverage machinery makers, have completed arrangements with Parnell & Sons Ltd., Bristol, England, for forming a new company, Barry-Wehmiller Machinery Co. Ltd. The new firm will manufacture and distribute the Barry-Wehmiller line of pasteurizers.

Ekco Twins for Foreign Trade

Ekco Products Co. has formed two new international corporations to facilitate foreign sales of its houseware products.

Ekco International Corp. will buy raw materials, equipment and finished products throughout the world for resale to companies trading in the U.S., Canada and the western hemisphere. It will also sell the products of the parent company everywhere outside the western hemisphere. Ekco Americas Corp. will sell in the western hemisphere, except in the U.S.

First year operations of the two corporations will bring sales of $2 million says Arthur Keating, chairman of Ekco Products Co.

More Money from Brazil?

A group of Brazilian bankers is studying ways of easing restrictions on the remittance of earnings overseas after sharp protests were sent from the U.S. Council of the International Chamber of Commerce to the Rio de Janeiro government. Mario da Camara, delegate of the Brazilian treasury and financial counselor of its embassy, says there is reason to believe the curbs would be modified.

At present, dividends passing out of Brazil for any one year are limited to 8 per cent of the original capital invested. Even at this rate, more dollars have been coming out of Brazil as returns on investment than have been going into the country as new investment despite the continuing flow of investment into Brazil, according to Mr. da Camara.

He cited the year 1950 in which $76 million was returned from Brazil as earnings on U. S. investments while approximately $24 million in new direct investment was reported.

Aircraft Subcontractors Still Fly High

Some suppliers have been grounded because of the stretch-out in the aircraft production program, but the majority will do as well or better than originally expected

A SENATE investigating committee begins hearings today (Mar. 31) on the effects of the stretch-out in the aircraft program.

Sen. Lyndon Johnson (Dem., Tex.) and his Senate Preparedness Committee will probably find: That while the stretch-out will undoubtedly cause short-term difficulties for some prime and subcontractors, it in the long run will aid aircraft companies and their suppliers by stabilizing the industry; that the stretch-out is more a readjustment of plans to reality of existing production schedules than a braking of production programs already in gear; and that the stretch-out is necessitated as a hedge against our building an air force that's obsolete by the time it's completed. More aircraft technological changes have occurred from 1945 to 1952 than from 1903 when the Wrights invented the flying machine to the end of World War II.

A Lot of Money—President Truman's budget for fiscal 1953 allots $21.7 billion to the U. S. Air Force, a cut of $7 billion from the original Department of Defense request. Almost $12.7 billion of the $21.7 billion will be for aircraft and missile procurement. If approved, the whittled appropriations will mean that we won't boost our present 90-group Air Force to 143 units until mid-1955, instead of mid-1954 as originally planned. The final goals don't change, just the timing. The budget allots nearly $4 billion for Naval aviation procurement, about the same as requested.

What will the changes mean to the estimated 60,000 companies who today are aircraft subcontractors or suppliers? First, bear in mind that little of the fiscal 1953 appropriations for aircraft will be spent in late 1952 or early 1953. In these days of long lead times, many aircraft producers deliver today planes that were ordered at least a year ago and get paid from funds appropriated by Congress 12 to 18 months ago. But fiscal 1953 appropriations have a profound effect on 1952 aircraft activity in that they determine this year's new programming and scheduling.

Here's the Rub—The stretch-out means that fiscal 1953's new programming and scheduling won't be on as grand a scale as originally expected. The funds obligated and appropriated for Air Force and Naval aircraft in the 12 months beginning next July 1 (with deliveries at least a year away) will total about $16.6 billion, just a little above the $16.2 billion obligated and appropriated in the fiscal year ending next June 30. But an estimated $11.5 billion will actually be disbursed by the U. S. on aircraft in fiscal 1953, compared with $5.2 billion in fiscal 1952.

Cause and Effect—Over-all, the result of all the shifting and turning on metalworking subcontractors in calendar 1952 will be this: The total number of subs will rise slightly above the present 60,000; current subcontractors will have more aircraft work this year than last but not two or two and a half times as much even though 1952 military aircraft production — about 10,000 planes of all types — will be 115 per cent above 1951 levels. Suppliers generally won't participate fully in the production increase because the stretch-out will permit some primes, especially the airframe builders, to do more of the work themselves.

We still will have a 143 group U. S. Air Force, but by mid-1955 instead of mid-1954. That means some disruptions in subcontracting, yet 60,000 or more suppliers will make parts for aircraft—over the next three years instead of two.

NEA

ELECTRONICS AT THE WHEEL
. . . stretch-out should aid suppliers

Although the aircraft subcontracting picture on the whole is good, some of the detail is not. Sharply curtailed will be production of trainers, transports and other planes with reciprocating engines. Subs involved in those programs can expect trouble, if they haven't already had it. Airframe manufacturers—partly because they are outproducing makers of engines and aircraft electronics and thus have more time—are pulling in some of their subs. Early this month, Lockheed Aircraft Corp. was reworking its 18,000 orders with subs and other suppliers.

The Same—The detail in the general aircraft subcontracting picture remains the same as originally forecast for some suppliers. The Naval air program is virtually on schedule and participants can expect a minimum of disruption. Planned Navy air strength is 16 carrier air groups, plus 49 support and 30 Marine squadrons. Today, the Navy has 14 carrier groups. It will have 10,000 planes by next June and reach its planned strength by June, 1953—two years before USAF reaches its target of 143 wings. The relatively small number of subcontractors in the

civilian aircraft program also will come up against few changes. The $350 million spent to build civil aircraft in 1951 will be about the same in 1952.

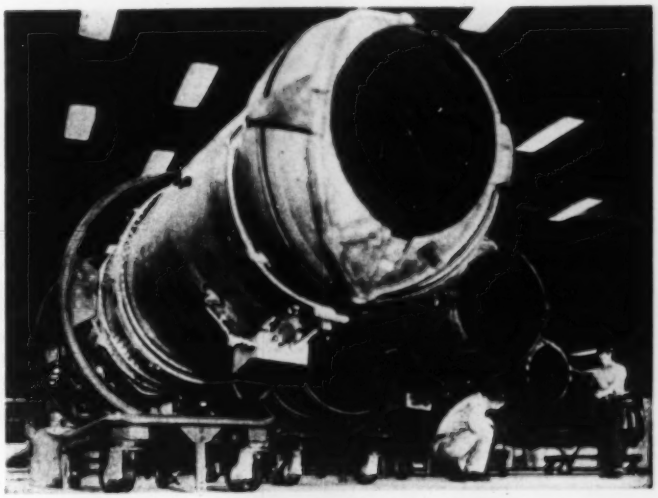
The detail in the general aircraft subcontracting picture will be even better than originally forecast for other subcontractors. We're irrevocably committed to the jet plane now. Although general aircraft production this year will rise 115 per cent above 1951 levels, jet plane output will jump 150 per cent and will continue to climb until the end of 1954. Subcontractors in the jet engine program have a good thing because power plant output must rise more than 150 per cent, since many jets need more than one jet engine. Boeing Airplane Co.'s XB52, the stratofortress heavy bomber, requires eight.

Promising — Subcontracting in aircraft electronics should also improve—both in the volume done by existing suppliers and in the total number of subcontractors—because total electronics manufacture this year is expected by Defense Production Administrator Manly Fleischmann to rise 268 per cent above the 1951 output. Much of that increase is accounted for by rising aircraft demands.

Yet, jet engine subcontracting probably offers the best opportunities for present and potential suppliers because of repetitive-type parts used in jet engines, the great number of the units that must be built and the rapid technological changes now occurring in their design and manufacture which give frequent opportunities for a potential sub to show what he can do to make a newly designed part.

A Decade of Jets—General Electric Co. built the first American jet engine to be successfully tested in this country, just ten years ago this month. It's one of seven prime contractors for the jet engine and now more than 4000 subs help supply the parts that go into the J-47 being assembled at its Lockland, O., plant on the northern outskirts of Cincinnati. Some 60 cents out of every dollar GE receives from the U. S. for jet engines goes to suppliers, and 90 to 95 per cent of all J-47 parts are furnished by subs.

At Lockland, the company maintains a department that specializes in subcontracting operations. Headed by W. P. Gullander, the department consists of purchasing, manufacturing and engineering specialists whose job is to help find and keep subcontractors.



GE TURBO-JET J-47 ENGINES GET FINAL TESTS

. . . subcontractors can expect best opportunities

The How of It—Those subcontracting specialists hunt new subcontracting opportunities. For example, Lockland has developed a method to fabricate jet engine blades. The conventional method, still in use on the J-47, is to forge them.

If the fabricated type is finally approved, the Lockland subcontracting department may allow current and potential subs to try their hand at producing it more cheaply or quickly than GE estimates it can. If a sub can prove he will do the job more efficiently, he gets the subcontract.

Demanding—The subcontracting department inspects the products sent in by new or potential subs and demands quality as well as quantity. One of its functions is to help the sub get that quality or quantity if it's lacking. GE specialists go into subcontractor plants to help solve quality problems and at one time the company bought $3 million worth of foreign machine tools and doled them out to suppliers to help get quantity. If necessary, it will do so again, although now the machine tool situation apparently is markedly improved.

The stretch-out in the aircraft program will mean order cancellations in the future as it already has in the past, but the long-term effect is largely beneficial because aircraft production becomes more stabilized and subcontractors in the program can be assured of good business for the next three years at least.

Growing is the aircraft industry—consisting of prime contractors for airframes, engines, electrical apparatus and other integral parts of an airplane. It had less than 300,000 employees before Korea, but 600,000 now. And we're producing at only 60 per cent of projected maximum rates.

Indications are that by the time peak production is reached early in 1953 and levels off there for the next two years, employment and subcontracting opportunities will be even higher. At the 1953-1955 plateau, dollar value of aircraft production may come near the record output of $16 billion turned out in 1944. Unit aircraft production won't approach the 1944 pace—inflation and increased complexity of aircraft have pushed unit costs five to ten times the World War II level—but subcontractors will still be able to fly high for the next three years at least.

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By H. C. TUTTLE *Detroit Editor*

Mirrors of Motordom

Auto industry's prices, both for cars and defense products, are under attack. Executives deny they're over-pricing cars and say cost is not a primary object in defense

DETROIT

POT SHOTS are being fired at the auto industry.

Right now the shooting is coming from two directions, but the target for the marksmen is the same—the industry's prices. The guns are trained on what the industry charges for its normal products and also what it gets for its military goods.

Defense—The industry is doing an excellent job of defending itself against the group of sharpshooters which has civilian prices in its sights. It is the conviction of most industry men that cars offer a better value today than ever before. By concerted action the industry intends to get that fact across to the public. Lead article in the current issue of *"Automobile Facts,"* a monthly publication of the Automobile Manufacturers Association, deals with two related postulates: That car use is being spread over an ever-widening portion of the population, and that automobiles are becoming better and at the same time less costly.

Proof of the first is easy. Between 1945 and 1952 passenger car registrations increased 66 per cent. Since 1948, says AMA, car-owning households have increased from 54 to 65 per cent of the total.

Measured—Proof of the second can be found along several yardsticks. One of these is the relation between disposable income of the average person and average new-car price. Since 1940, the amount left after taxes for the average man has increased 156 per cent. New car prices are up 136 per cent. The Bureau of Labor Statistics reports that in the last ten years prices of motor vehicles have gone up less than any other major commodity group except chemicals. In terms of the number of hours' work to buy a car, or the number of bushels of wheat, or crates of eggs, or bales of cotton which must be sold to acquire the cost of a new car its price is lower than in 1940. To be specific, AMA lists the average new car price in 1940 at about $778. A recent average (December, 1951) is approximately $1835. These prices are developed by averaging the factory retail prices of the lowest cost closed model sold by each of the car makers. Included in this "factory retail" price are the excise tax and the dealers' markup, but not the transportation charge or state and local taxes. To purchase this composite car the average factory worker in 1940 had to dish out 31 weeks earnings. The work-price now is 28 weeks.

The most valid complaint of those who are trying to drill holes in automakers' prices is that the deluxe models have become too desirable. Few prospects want to know what the price of the cheapest closed model is. Most want to know what a car will cost with automatic transmission, radio and heater, directional signals, etc., i.e.—the works. When they get the figure, then comes the wail: "You guys are gonna price yourself out of the market."

Bellwether—Automen are watching Packard's salesrooms closely. Apparently the new advertising campaign aimed at educating the public of the lowness of price for a top bracket car is having a stimulating effect. Demand for the small "200" Packard has picked up significantly.

If Packard's strategy appears to be paying off, more emphasis will undoubtedly be placed by other makers on their least fancy lines. The about-face would come, however, only after much deliberation because the highest priced series of many manufacturers was singled out for the most reworking in style and engineering this year.

Another Matter—The industry's defense against the other load of scattershot aimed in its direction is considerably more difficult. Cost of military procurement is, of course, under intense scrutiny and there's a happy headline-hunting ground for anyone who can come up with figures showing it costs the military more to buy from "A" manufacturer than from "B."

Tank Torque Transmissions

Buick-built tank transmissions get a final coat of white paint before being shipped to the Army. The torque converter transmissions, which weigh almost as much as an automobile, hold 27 gallons of oil. Output has increased monthly since production began last August. About 1900 employees now work on the project

A big commotion, not to say a stink, was caused when it was discovered that the machine tools which Fisher Body was to build would cost much more than the identical machines built by the Bullard Co.

Congressional Charge — Now comes the charge that the C-119 Packets, being built by Kaiser-Frazer Corp. under Air Force contract, carry a price tag $100,000 higher than those made by Fairchild Engine & Airplane Corp. Rep. William H. Ayres (Rep., O.) who made this charge asserted that if Fairchild made all the planes instead of shipping parts

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to K-F for assembly at Willow Run, that much could be saved.

Edgar Kaiser, K-F president, called Representative Ayres "grossly misinformed" and took the witness stand last week before a closed House Armed Services Subcommittee to explain that the cost of C-119s his company builds cannot be determined yet, and to tell the committee that only the first 30 planes will use Fairchild-furnished parts, provided to accelerate production and to familiarize the workmen with the job until parts from K-F's manufacturing operations and those of its subcontractors can be incorporated into the first all K-F-built plane. The Air Force did a little bristling over Representative Ayres' charge of wastefulness, too. Not saying whether the $100,000 figure is right or wrong, an Air Force spokesman explained that cost is secondary to production dispersal.

Source?—Fairchild's place in the controversy, if one exists, is screened. Some Detroiters figure Representative Ayres received his information from that source. K-F's receipt of the C-119 contract is rumored to have cost Fairchild a new plant, and a rephasing of Air Force schedules has reportedly kept Fairchild from activating the former Douglas Aircraft Plant in Park Ridge, on Chicago's northwest outskirts.

The time-honored reputation which automakers have earned for being able to cut cost corners has been put in jeopardy by the industry's failure on occasion to be low bidder on defense work. The case of the Bullards and the C-119s has widened the cracks in this reputation still further.

Industry men admit that if cost is to be the only consideration, there are many defense jobs which the industry now has which can be opened for question, at least under the stretched-out schedules which play hob with the mass-production thinking and cost-paring abilities of the automen. But they point out that the explanations never quite offset the damage done by the guy who fires the first shot.

K-F, Convair Merger Pends

Merger or no merger, Kaiser-Frazer is going to remain in the automobile business. That's the word out of the corporation in response to an inquiry as to what will happen if the company ties up with Consolidated Vultee Aircraft Corp. and Floyd Odlum's Atlas Corp., which has working control of Convair.

Long rumored in aviation circles that such a merger was being discussed, the formal announcement by the companies indicated that another month would be required before anything more concrete could be said than an admission that the angles of such a merger were being considered by the three firms.

K-F conceivably would be the gainer from having the backing of a strong financial organization such as Atlas. And K-F has a 49 per cent ownership of Chase Aircraft Co. Inc. plus Willow Run and some sharp manufacturing brains which might look like pretty good plums to Convair.

It is no secret that Henry J. Kaiser is extremely air-minded, and that his aluminum company is vitally interested in aircraft.

Auto, Truck Output

U. S. and Canada

	1952	1951
January	409,406	645,688
February	461,294*	658,918
March		802,737
April		680,281
May		695,898
June		653,682
July		522,858
August		571,442
September		505,758
October		558,971
November		480,199
December		402,729
Total		7,179,161
Week Ended	1952	1951
Feb. 23	110,542	199,478
Mar. 1	118,397	177,567
Mar. 8	115,126	180,819
Mar. 15	120,392	182,819
Mar. 22	123,300	174,953
Mar. 29	125,000*	184,469

Sources: Automotive Manufacturers Association, Ward's Automotive Reports. *Preliminary.

Smooth Move at Chrysler

It's been moving month for the truck engine-building operations of Chrysler Corp. More than 500 machine tools made the 25-mile trek from the corporation's Highland Park plant to its new Trenton, Mich., plant in 31 working days, and with no accompanying loss in engine output.

This was accomplished through an involved and precise schedule, the purpose of which was to keep each machine out of operation for only two days, one while it was being moved and the other while it was being installed. In preparation for the down-time each machine built up a two-day bank of parts on which it had worked so its absence would not be noticed.

Chrysler management would like to figure out a way to make another move as smoothly. Staffing the new and giant proving ground near Chelsea, Mich., is proving to be unexpectedly difficult considering the job-shortness of the Detroit area. Getting the men for the higher echelons has posed less of a problem than staffing the center with test drivers, mechanics, etc. The test area, about 50 miles from downtown Detroit, and close to only two small towns, holds little inducement.

Problems with Shell Molding

Some machinery makers have been intrigued with the shell molding process and have developed automatic devices to raise production with it. It is understood one of these will in the relatively near future be put to work in its maker's plant running shell molds off for outside customers. Rumor had been that this machine would be sold to an automaker for its exclusive use, but it now appears that it will be available on a jobbing basis. Still plagued with "bugs," the manufacturer is not discussing the machine or his plans for it with anyone.

One of the biggest advantages cited for shell molding is the high dimensional accuracy which this casting method makes possible and the elimination of much of the machining work. Surface finish in the as-cast state is also good. But one of the companies deeply engaged in shell molding, Ford Motor Co., reportedly is having some unexpected difficulties on first score. Crankshafts as-shell-molded are said to be coming out of the molds undersize and must be brought up to dimension through lavish application of more metal by the metallizing process.

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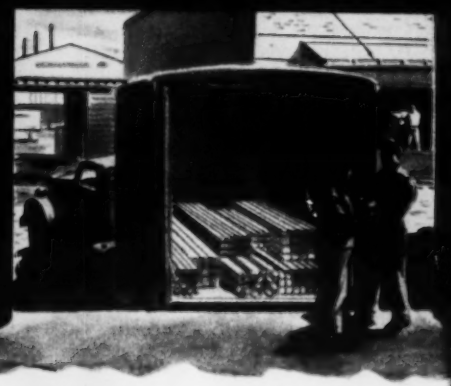

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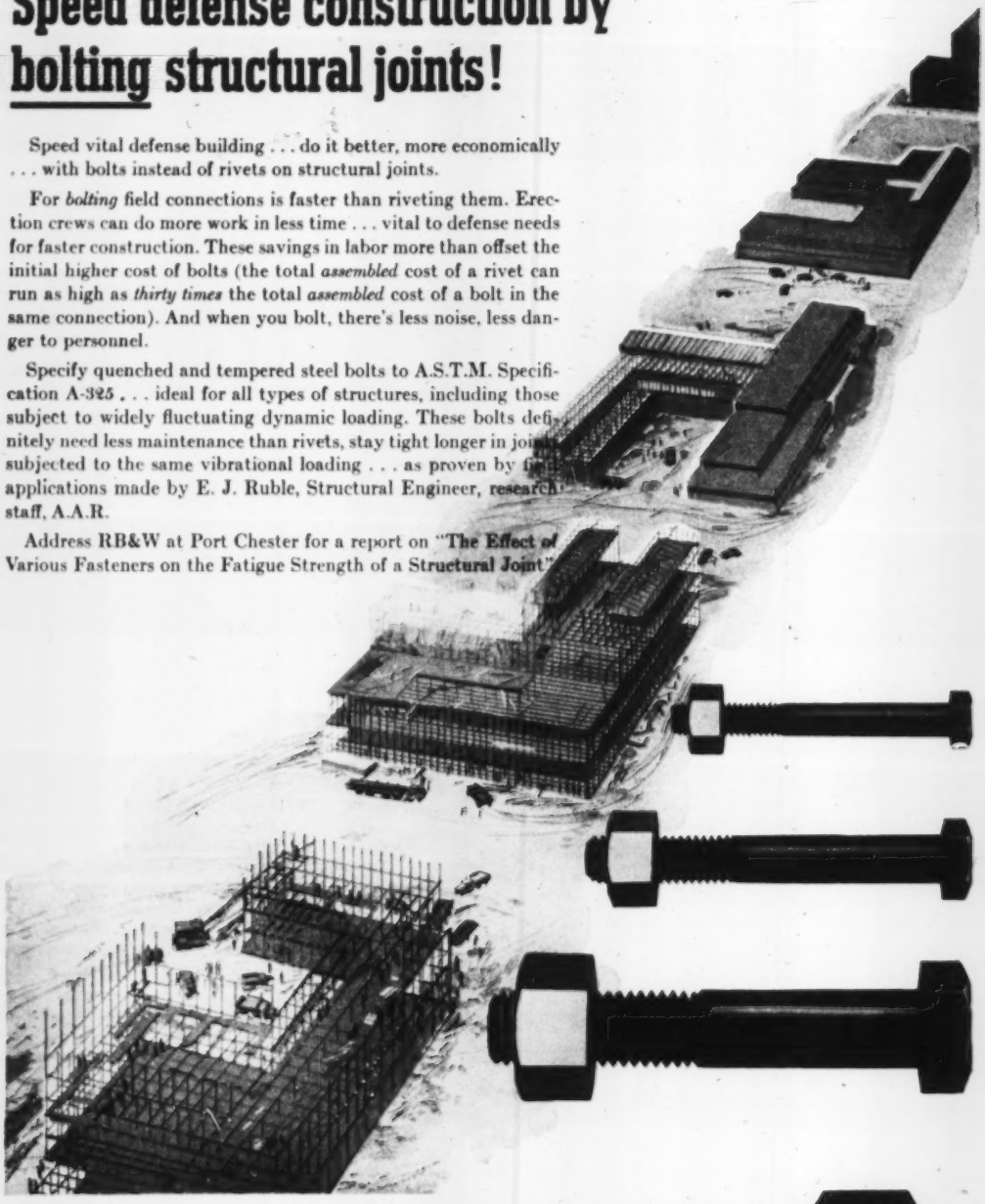

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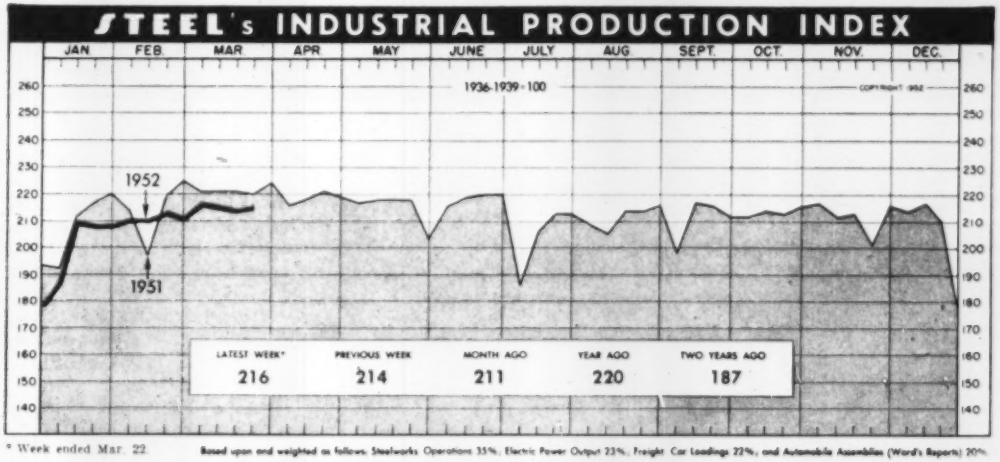


* Week ended Mar. 22. Based upon and weighted as follows: Steelworks Operations 35%; Electric Power Output 23%; Freight Car Loadings 22%; and Automobile Assemblies (Ward's Reports) 20%.

Civilian metals supply eases and defense orders keep rolling in, giving impetus to business activity. Industrial production index shows strength

RELAXING of NPA's grasp on metals is certain to be a factor in any near-future rise in business activity. But how great will that factor be?

The present lull in industrial production largely can be chalked up to the stretch-out of the defense program, over-stocked inventories and consumer resistance—besides low rations of materials needed in production. But certain indications point to a change in the present sidewise movement of business and a marked rise may occur as metals become easier to obtain.

Momentum—First, defense production—while far below World War II levels—is gaining momentum all the time. Defense orders, slated to increase by more than a third by the end of 1952, are expected to bring rising employment plus added civilian demands for goods.

Also, manufacturers in the first quarter were using up their inventories and not placing new orders. Now that supplies are at more realistic levels, they are starting to order more parts and materials.

Perking Up?—Consumers of civilian goods may also start spending now that the tax date is passed. Spring weather coupled with a late Easter could increase substantially retail buying in the early weeks in April. And the trend could well continue during the late spring and early summer months.

With more scarce materials earmarked for civilian manufacturers, the business upturn may be stronger than was previously hoped for.

Index—Industry's continued production rise is reflected in STEEL's industrial activity index at the top of this page. In the week ended Mar. 22 the index moved up 2 points to 216 (1936-1939 = 100). Freight carloadings and electric power output were back to normal, while automotive production continued to increase.

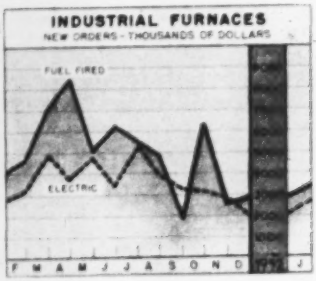
Record Scheduled . . .

While negotiations on wage increases and other benefits were going on between steelmakers and union officials, the industry made tentative plans to continue its record-breaking climb in production. American Iron & Steel Institute estimated that 2,131,000 tons of ingots and steel for castings would be turned out in the week ending Mar. 30, if the steel companies are allowed normal operating schedules. That tonnage would pass the previous week's all-time high of 2,127,000 net tons. Month-ago production was 2,096,000 tons, while a year ago total output was 2,069,000 net tons of ingots and castings steel.

Cautious Optimism . . .

Automakers are shifting production schedules into second gear now that the government has increased materials allotments and lifted output limitations on number of units. Automotive employment is starting an upward climb with rehirings running from sizable to small to static amounts, says *Ward's Automotive Reports*. Although there is unanimous agreement that the downtrend in employment, started in mid-1951, has definately reversed, *Ward's* says that optimism in Detroit is tempered with caution. Unless there are further gains in production, there won't be any return to the higher 1951 employment levels.

Turnout of both cars and trucks in the week ended Mar. 22 reached 123,300 units from both U. S. and Canadian plants, says *Ward's*. That figure marks a rise of 2908 units from the previous week's production. During the same week last

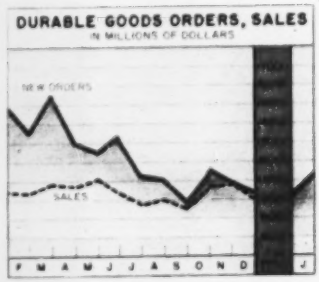


Industrial Furnaces

New Orders—Thousands of Dollars

	Fuel Fired*		Electric	
	1952	1951	1952	1951
Jan.	3,379	4,033	2,856	2,764
Feb.		4,670		3,212
Mar.		7,019		4,846
Apr.		8,497		3,657
May		5,044		4,766
June		6,259		3,370
July		5,303		5,587
Aug.		4,850		3,891
Sept.		1,821		3,250
Oct.		6,374		3,172
Nov.		2,516		2,882
Dec.		2,875		2,100

* Except for hot rolling steel.
Industrial Furnace Mfrs. Assn.

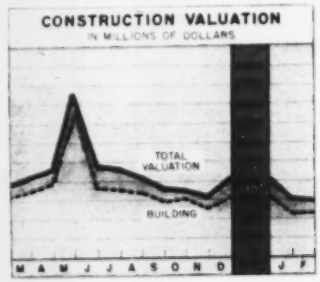


Durable Goods Orders, Sales

In Millions of Dollars

	New Orders		Sales*	
	1952	1951	1952	1951
Jan.	11,340	15,050	11,466	10,430
Feb.		13,474		10,390
Mar.		15,542		10,851
Apr.		12,987		10,739
May		12,404		11,150
June		13,303		10,383
July		11,274		9,741
Aug.		11,046		10,052
Sept.		9,880		9,559
Oct.		11,584		10,700
Nov.		11,090		10,753
Dec.		10,263		10,170

*Seasonally adjusted. U. S. Office of Business Economics.

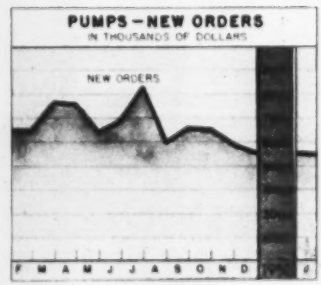


Construction Valuation

(37 States)—In Millions of Dollars

	Total		Building	
	1952	1951	1952	1951
Jan.	902.1	1,043.2	695.4	881.9
Feb.	885.2	1,140.5	697.8	962.3
Mar.		1,267.4		1,043.8
Apr.		1,375.0		1,108.9
May		2,573.0		2,295.0
June		1,408.9		1,088.4
July		1,379.8		1,084.7
Aug.		1,262.8		1,043.5
Sept.		1,082.9		884.2
Oct.		1,001.4		914.4
Nov.		931.8		771.6
Dec.		1,234.3		939.1
Total		15,751.6		13,027.9

F. W. Dodge Corp.



Pumps, New Orders

In Thousands of Dollars

	1952	1951	1950
Jan.	5,517	6,477	2,586
Feb.		6,480	2,938
Mar.		7,654	3,313
Apr.		7,583	3,376
May		6,371	3,668
June		6,852	4,153
July		8,358	4,080
Aug.		5,911	6,429
Sept.		6,552	5,191
Oct.		6,506	4,985
Nov.		5,908	5,961
Dec.		5,553	6,720
Total		80,175	53,400

Hydraulic Institute.

Charts Copyright 1952 STEEL

Issue Dates of other FACTS and FIGURES Published by STEEL:

Employ. Metalwkg.	Mar. 10	Indus. Production	Feb. 18	Refrigerators	Feb. 25
Employ. Steel	Mar. 24	Malleable Castings	Mar. 17	Steel Castings	Mar. 17
Fab. Struc. Steel	Mar. 10	Machine Tools	Mar. 10	Steel Forgings	Feb. 25
Foundry Equip.	Mar. 17	Prices	Feb. 18	Steel Shipments	Dec. 17
Freight Cars	Mar. 10	Purchasing Power	Mar. 3	Vacuum Cleaners	Mar. 24
Gear Sales	Feb. 11	Radio, TV	Mar. 24	Wages, Metalwkg.	Jan. 28
Gray Iron Castings	Mar. 17	Ranges, Elec.	Feb. 25	Washers	Mar. 3
Ironers	Jan. 21	Ranges, Gas	Feb. 25	Water Heaters	Mar. 24

year, automakers in the two nations rolled off assembly lines 174,953 trucks and autos.

Furthest Drop . . .

Cost of living between mid-January and mid-February dropped the furthest since before Korea, estimates the Bureau of Labor Statistics.

This is the first drop (0.6 per cent) in the Labor Department's index since June, 1951. Chiefly responsible for the downward movement was a 2.1 per cent decline in retail food prices, largest since December, 1949. The drop, says the Labor Department, means the wages of 1.15 million railroad workers will be cut by 1 cent an hour as of Apr. 1.

But wholesale prices, which led the downtrend movement, began to show strength by Mar. 18, says the bureau. All commodities rose 0.2 per cent during the week ended that date to 11.8 per cent of the 1947-1949 average. All commodities other than farm and foods rose 0.1 per cent in the week ended Mar. 18 to 113.2 per cent of the 1947-1949 average.

Decline in Value . . .

Purchasing value of the dollar in February was 56.7 cents of the January, 1939, dollar, estimates the National Industrial Conference Board.

In the past year, purchasing value dropped 1.7 per cent from the February, 1951, dollar of 57.7 cents in terms of the base figure (January, 1939 = 100 cents).

Need Less . . .

The warmest European winter in many years coupled with rising Western European coal production lowered overseas U. S. shipment of bituminous. Heavy rains also made possible greater production of water power so less coal is needed for power production, says the Commerce Department. Meanwhile the U. S. output of bituminous continues to run nearly at last year's levels. In the week ended Mar. 15, bituminous producers shipped 9,760,000 net tons, compared to the year ago same week total of 9,980,000 net

tons, says the National Coal Association. Shipments in 1952 to Mar. 15 total 113.8 million net tons, slightly below the 116.2 million tons mined in the same period last year.

Gain in Sales . . .

Factory sales of household vacuum cleaners in February gained 2.5 per cent over January. February sales totalled 235,936 units compared to the 230,226 vacuum cleaners sold in January, says the Vacuum Cleaner Manufacturers' Association. Sales in February were down 9.8 per cent from the 261,572 units sold in February, 1951.

Markdown Hazard . . .

Retail dealers are worried about further factory price cuts while they have merchandise on their shelves bought at higher prices. Some are afraid to buy more than they can sell in a few days. To assure its dealers against such losses, Magnavox Co. is guaranteeing its radio-phonograph and television sets against price cuts for 90 days after shipment. The company says that a 90 day turnover of inventory by dealers is a reasonable expectancy and the company guarantee should be a practical solution to the markdown hazard.

Casualties Up . . .

Business failures rose to 181 in the week ended Mar. 20 from 156 in the preceding week, reports Dun & Bradstreet, Inc. The new rise brings failures to the highest weekly level since July 1951, when casualties reached 184.

Trends Fore and Aft . . .

Employment remained virtually unchanged between January and February, and nonagricultural employment totaled 53.7 million in February, says the Commerce Department . . . Shipments of steel forgings in January showed the first increase in three months; January shipments totaled 271 thousand tons, 17 per cent above December . . . Backlog of highway deficiencies in U. S. is estimated at $32 billion by American Road Builders' Association. Defense plants depend on highways for 66 to 80 per cent of their parts and materials, says the association . . . In the first two months of the year 487 new locomotives were installed by Class 1 railroads. New locomotives on order on Mar. 1 totaled 1590 . . .More money was loaned to veterans for GI home loans in 1951 than during any year since the program went into effect in 1944.

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Output (per cent of capacity)[2]	102.0	101.5	100.5
Electric Power Distributed (million kwhr)	7,440[1]	7,414	6,847
Bituminous Coal Output (daily av.—1000 tons)	1,628	1,650	1,664
Petroleum Production (daily av.—1000 bbl)	6,410[1]	6,404	6,043
Construction Volume (ENR—millions)	$250.8	$223.8	$159.8
Automobile, Truck Output (Ward's—units)	123,300	120,392	174,953
TRADE			
Freight Car Loadings (unit—1000 cars)	735	709	749
Business Failures (Dun & Bradstreet, number)	181	156	170
Currency in Circulation (millions)[3]	$28,361	$28,452	$27,121
Dept. Store Sales (changes from year ago)[3]	−11%	−16%	+9%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$19,571	$15,515	$20,236
Federal Gross Debt (billions)	$258.4	$260.2	$254.8
Bond Volume, NYSE (millions)	$12.7	$14.6	$11.6
Stocks Sales, NYSE (thousands of shares)	6,356	6,947	5,645
Loans and Investments (billions)[4]	$73.6	$73.4	$69.5
United States Gov't. Obligations Held (billions)[4]	$31.8	$31.7	$30.8
PRICES			
STEEL's Weighted Finished Steel Price Index[5]	171.92[1]	171.92[1]	171.92
STEEL's Nonferrous Metal Price Index[6]	243.6	243.6	239.2
All Commodities[7]	111.8	111.6	115.0
All Commodities Other Than Farm and Foods	113.2	113.1	116.6

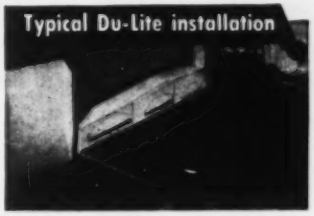
*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1951, 1,999,035; 1952, 2,077,040. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100.

On any steel blackening problem

DEPEND on DU-LITE for a Superior Finish

Courtesy The Poly Choke Co.

Du-Lite gave this part with its complicated knurls, slots, threads, etc. a fine rust-resistant durable black finish. It is typical of many other parts, small and large, which have been black oxidized by Du-Lite for many years. Moreover, Du-Lite meets most individual and government specifications including 57-0-2C for Type III Black Oxide finish.



Du-Lite installations are simple, compact, easy to operate. Du-Lite equipment can be tailored to fit production requirements on all types of jobs with a maximum of speed and economy. Du-Lite also makes a complete line of cleaners, strippers, wetting agents, passivating agents, rust preventatives, burnishing compounds etc. for any metal finishing application.

See your nearest Du-Lite Field Engineer or write for more information.

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Rush information on your metal finishing products.

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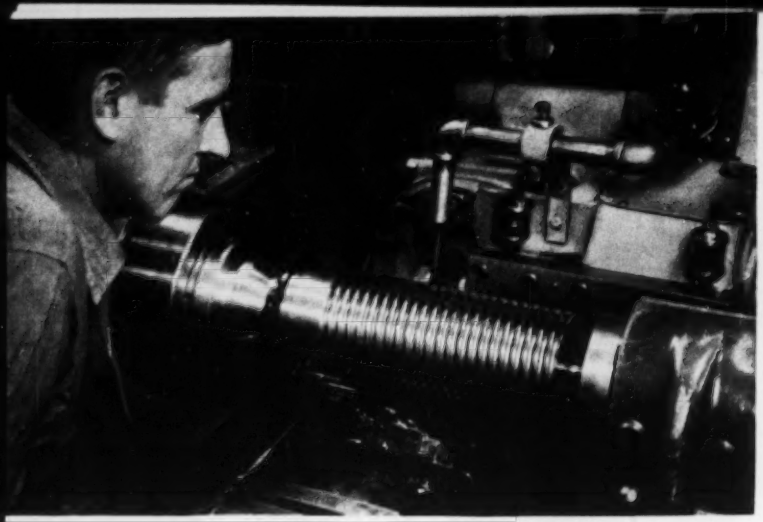
METAL FINISHING SPECIALISTS



THREAD MILLING A SCREW. Metal: SAE 2345 steel heat-treated to 28 Rockwell • Machine: Lees Bradner thread miller • Part: 5¼" adjusting screw for press brake • Operations: rough and finish thread milling Tool: high-speed steel • Feed: 0.260 depth on roughing Cutting Oil: Sunicut 105

BROACHING A GEAR KEY-WAY. Metal: SAE 2345 steel forging 220 Brinnell • Machine: 3L8 La Pointe hydraulic broach • Part: gears for shaper, produced two at a time • Tool: 3' high-speed steel broach • Cutting Oil: Sunicut 105

SUNICUT 105 REPLACES THREE OILS AND SOLVES FIVE MAJOR PROBLEMS

Buying three cutting oils and then blending them to make additional grades had proved highly unsatisfactory to a machine tool builder. The smoke was noxious, employees complained of skin irritations, the color of the oils made it difficult to see the work, tool life was short and finishes not up to standard. To help solve these problems, the company called in a Sun representative and on his advice tested Sunicut 105 on the three tough jobs pictured here.

So good were the results that the company adopted Sunicut 105 for every machine in the plant and has used it exclusively for the past two years. The operators like its transparency. There are no complaints about smoke or skin irritations. Finishes have improved and tool life increased as much as 50 percent.

For complete information on Sun's cutting oils, write to Department S-9 and we will send you a copy of our informative, illustrated booklet "Cutting and Grinding Facts."

CUTTING A LARGE GEAR. Metal: bronze 180 Brinnell • Machine: Gould & Eberhardt gear hobbing machine • Part: main drive worm gear wheel for large shear • 42⅜" O. D.; 5" thick; 87 teeth • Tool: high-speed steel hob • Feed: 0.006 • Speed: 42 rpm • Cutting Oil: Sunicut 105

SUN INDUSTRIAL PRODUCTS

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SUNOCO®

Men of Industry

LLOYD R. COOPER
. . . Heppenstall's chief metallurgist-Eddystone

NORMAN F. McCARTHY
. . . elected V. P. of Mack Mfg.

J. S. WILBUR
. . . mgr. Cleveland-Cliffs ore sales

Lloyd R. Cooper, director of research, **Heppenstall Co.,** Pittsburgh, was appointed chief metallurgist of the Eddystone, Pa., plant, which Heppenstall is reactivating in connection with the U. S. Air Force expansion program. **Dr. Robert B. Corbett** was appointed acting director-research at Pittsburgh.

Hyman-Michaels Co., Chicago, elected as vice presidents: **S. J. Barsy,** in charge of the steel division, and **J. R. Mathews,** in charge of the railroad equipment department, both with headquarters in Chicago; **Max Mabel,** who moves to St. Louis as head of that division's scrap operations.

A. F. Koch was named works manager of the newly formed Wooster, O., division, **Borg-Warner Corp.** He was manager of the Norge Division's Chattanooga, Tenn., plant.

Vincent J. Madden was appointed purchasing agent, **ACF-Brill Motors Co.,** Philadelphia. Appointments at the company's Hall-Scott Motor Division at Berkeley, Calif., include: **Norton C. Sather,** assistant division manager; **Donald M. Bristol,** purchasing agent; and **Frank T. Corbin,** sales representative.

Bethlehem Steel Co. appointed **Frank A. Baker Jr.** chief engineer of its Sparrows Point, Md., plant. He succeeds the late **John Bimestofer Jr.**

Norman F. McCarthy was elected vice president, **Mack Mfg. Corp.,** New York. He will have headquarters at the Allentown, Pa., plant. Mr. MaCarthy was with Martin-Parry Corp. as purchases director.

James F. Toole was named vice president-treasurer, **Sperry Gyroscope Co.,** division of Sperry Corp., New York. Mr. Toole, treasurer and comptroller of the company since 1949, joined Sperry Corp. in 1937 and transferred to Sperry Gyroscope division in 1941.

Robert W. Hunt Co., Chicago, elected **L. H. Scott** vice president-manager, engineering department; **S. C. Sexauer,** secretary-treasurer; and **W. F. Anderson,** assistant secretary-treasurer. These changes followed the death of **D. W. McNaugher Jr.,** who was vice president and treasurer.

W. E. Henges was elected president, **Graybar Electric Co. Inc.,** New York.

W. Harry Wright was appointed chief engineer, **Weirton Steel Co.,** Weirton, W. Va. He succeeds **Clarence J. Klein,** named vice president-engineering. **L. A. Fugassi** was appointed chief draftsman.

John N. Crombie was appointed metallurgical engineer-tinplate, **United States Steel Co.,** Pittsburgh. He joined U. S. Steel in 1922. Since 1947 he has been assistant metallurgical engineer-tinplate.

J. S. Wilbur was appointed manager of the ore sales department of **Cleveland-Cliffs Iron Co.,** Cleveland, to succeed the late **William M. Green.** Mr. Wilbur joined Cleveland-Cliffs in 1940. Following military service he rejoined the company in 1945 and was made assistant manager-ore sales in 1950.

Robert W. Kise was named manager of product planning for **General Electric Co.'s** industrial heating department. He was sales manager for the department's industrial heaters and devices section.

National Pallet Corp., Pittsburgh, elected **Lee S. Miller** vice president-sales, **Henry N. Faxon Jr.,** assistant sales manager, and **Mathew Johnson,** purchasing agent.

Edwin M. Miller was named plant superintendent of the machine division, **Lincoln Electric Co.,** Cleveland. His appointment follows resignation of **H. F. Kneen,** manufacturing vice president.

Walter Ising was elected president, **Laube Steel Co.,** Chicago, to succeed the late **Roy E. Laube. N. A. Shapiro** became executive vice president, **W. C. Bruns,** secretary-treasurer, and **Ben Gore,** director of sales.

William H. Peters was appointed manager-manufacturing at **Willys-Overland Motors Inc.,** Toledo, O.

Raytheon Mfg. Co. appointed **Harold L. Herndon** district manager-

sales and service for the Cleveland district. Formerly service manager for the Cleveland district, he is succeeded by **Albert R. Wolfe.**

Harbison-Walker Refractories Co.,

MIRO MIHELICH
heads Harbison-Walker subsidiary Brazil

Pittsburgh, appointed **Miro Mihelich** manager of Harbison-Walker Minerios Ltd., a subsidiary company organized for developing sources of raw materials in Brazil.

Lincoln Park Industries Inc., Detroit, appointed **Henry C. Wulff** plant superintendent, Lincoln Park division. He most recently was assistant works manager.

At the Homestead, Pa., District Works, **U. S. Steel Co., Robert A. McClure** was named assistant to the general superintendent-manufacturing. He is succeeded by **John W. Price Jr.** as assistant division superintendent, slabbing and plate mills. **Shirley M. Leavitt** becomes assistant to the general superintendent-costs, and is succeeded as plant industrial engineer by **Roy Gilliland.**

John M. Rachal, with **Carrier Corp.,** Syracuse, N. Y., since 1928, and formerly sales manager, was appointed manager, Carrier International Division.

Barium Steel Corp. announces appointment of **Harold V. Bright** as vice president of **Kermath Mfg. Co.,** Detroit subsidiary.

William C. Van Clief Jr. was appointed manager of **Pittsburgh Plate Glass Co.'s** new power driven brush factory at Baltimore. He has served as an industrial consultant since 1946 and prior to that was with Wright Aeronautical Corp.

McLouth Steel Corp. has opened a Chicago sales office in the Continental Cos. building. **John M. Lepo** is district sales manager.

Harold N. Taylor was appointed assistant director of purchases, **Le Roi Co.,** Milwaukee. He is succeeded as buyer and expediter at Cleveland by **Arthur F. Kless.**

J. Carl Ferguson was promoted to assistant product manager, electrical conductor, in the Chicago sales office of **Kaiser Aluminum & Chemical Sales Inc.**

Wendell P. McKown Jr. was appointed works manager, **Cooper Alloy Foundry Co.,** Hillside, N. J. For the last ten years he has been

WENDELL P. McKOWN JR.
works mgr. for Cooper Alloy

purchasing agent for Pratt & Whitney Aircraft Division, United Aircraft Corp.

Emmett A. Brady was named works superintendent, Coke Works, **American Steel & Wire Division,** Cleveland, U. S. Steel Co. Associated with the works for a number of years, since 1946 he held the position of department superintendent, batteries and coal handling. **George A. Curran** succeeds Mr. Brady in the latter position, and **John W. Harter** becomes department superintendent, benzol and coal chemicals.

Norman A. Matthews was appointed assistant chief metallurgist of **American Brake Shoe Co.'s** metallurgical research department at Mahwah, N. J. He formerly was division metallurgist for the electro-alloys division at Elyria, O.

Frank Malee will be superintendent of **Budd Co.'s** new tank plant, now under construction in Philadelphia. He has been superintendent, small tools division.

L. B. Kruse was appointed district manager of the Detroit office of **Kurt Orban Co. Inc.**

Clyde W. Kelly was named chief engineer, Fenestra Window & Door Division, **Detroit Steel Products Co.,** Detroit.

C. C. Womack was named assistant to the general superintendent at Youngstown for **U. S. Steel Co.,** and **David H. Everest** was named plant industrial engineer, succeeding Mr. Womack.

W. H. White, former Detroit district manager of tool steel sales, Allegheny Ludlum Steel Corp., is now general manager, **Amalgamated Steel Corp.,** Cleveland.

L. E. Bluhm was appointed general manager, **Acme Welding Supply Inc.,** Milwaukee. He formerly was a field engineer in Wisconsin for Nelson Stud Welding.

A. F. Siers was appointed sales manager, motor coach engine division, **Fageol Products Co.,** Kent, O.

Joy Mfg. Co., Pittsburgh, appointed

W. L. WEARLY
. . . Joy Mfg. gen sales V. P.

W. L. Wearly general sales vice president in charge of all domestic sales, plus Canada and Mexico. He is succeeded as vice president in charge of coal machinery sales by **Hugo C. Nyquist. J. Stuart Mor-**

Drills, Chamfers and Taps Tank Wheel Arms

Another Special by Cross

- ★ Drills, chamfers and taps four holes; drills chamfers and reams one hole in Tank Intermediate and Rear Wheel Arms.
- ★ Material—Cast Armor. Hardness—Rock. C35
- ★ 64 pieces (32 right and 32 left hand) per hour at 100% efficiency.
- ★ Duplex work holding fixture holds one right hand and one left hand part in each station.
- ★ Six-station power operated index table, including one for loading, two for drilling, one for chamfering, one for reaming and one for tapping.
- ★ Other features: Fluid motor index drive, J.I.C. standard construction with stranded wire, hardened and ground ways, hydraulic feed and rapid traverse, individual lead screw feed for tapping, Sav-A-Tap spindle construction.

Established 1898

THE CO.

DETROIT 7, MICHIGAN

Special MACHINE TOOLS

PAUL J. SCHERBNER
. . . supt. of Winters Foundry nonferrous

C. B. LEVINSON
. . . new president, Knapp Bros., Mfg.

NELSON W. DEMPSEY
. . . . Chicago mgr.-operations for AS&W

row was named sales manager, oxygen equipment.

Paul J. Scherbner was named superintendent of the nonferrous foundry department, **Winters Foundry & Machine Co. Inc.**, Canton, O. Since 1948 he has been foundry metallurgist at Sperry Gyroscope Corp.

Dumas Steel Corp. appointed **J. W. Clouser** manager of sales of its Jersey City, N. J., warehouse to succeed **L. N. Montana**, resigned.

Dow Furnace Co., Detroit, appointed **Floyd E. Harris** chief research consultant and a director. He retired recently from the Buick Division, General Motors Corp., as furnace engineer after 35 years of service.

W. C. Johnston was appointed director of sales, industrial department, **H. D. Taylor Co.**, Buffalo.

C. B. Levinson was elected president, **Knapp Bros. Mfg. Co.**, Cincinnati. **Al Levinson**, formerly president, remains active in the business and was named chairman of the board. The company has moved into new quarters at 16 E. 72nd St. in suburban Carthage. The plant and office was formerly located in Rossmoyne, O.

Thomas A. Jones was elected president, **W. A. Jones Foundry & Machine Co.**, Chicago. **Frederick H. Hoge** becomes chairman of the board. **Robert B. Moir** is now vice president - engineering; **Joseph A. Marland**, vice president-manager of sales and service; **James B. Christerson**, vice president-treasurer; and **Robert E. Whiteway**, secretary-production manager.

Sharon Steel Corp., Sharon, Pa., appointed **J. H. Stockfisch** maintenance engineer.

Nelson W. Dempsey was appointed manager of operations of the Chicago district, **American Steel & Wire Division**, U. S. Steel Co. He succeeds to the position formerly held by the late **John R. Gaut**. Mr. Dempsey joined the wire company in 1917. Since 1951 he has been assistant manager-operations at Chicago.

W. G. Rainey, manager of **Diversey Corp.'s** Nashville, Tenn., sales district, was named assistant manager, southern division.

George Pfisterer was named director of personnel, **Skilsaw Inc.**, Chicago.

Wendell A. Doty was promoted to comptroller, **Rust Engineering Co.**, Pittsburgh. He is succeeded as assistant comptroller by **E. F. Selander**. **Lindley J. West** was appointed auditor.

OBITUARIES . . .

Marion D. Harbaugh, 59, president, **Lake Superior Iron Ore Assn.**, Cleveland, died Mar. 19 of a heart attack.

Walter C. Hemingway, 64, president, **Pittsburgh Steamship Division**, U. S. Steel Co., died Mar. 21 at Atlantic City, N. J. He joined American Bridge Co., U. S. Steel subsidiary, in 1909, and remained with U. S. Steel throughout his entire business career. Mr. Hemingway became president of Pittsburgh Steamship Co. at Cleveland in 1948.

Hyman L. Berkman, 64, president of **Steel Trading Corp.**, Pittsburgh, which operates Fort Pitt Malleable Iron at McKees Rocks, Pa., died Mar. 16 in Florida. He also was a founder of Louis Berkman Co., Steubenville, O.

C. Ives Waldo Sr., 70, who retired Jan. 1 as a salesman in the Chicago office of **Pickands, Mather & Co.**, died Mar. 15 in Winnetka, Ill.

George H. Nye, 58, president, **Circular Tool Co. Inc.**, Providence, R. I., died Mar. 19 while in Chicago attending the ASTE convention.

Clifford H. Wells, 71, president, **A. H. Wells & Co. Inc.**, Waterbury, Conn., died Mar. 17. He was also a director of Waterbury Rolling Mills Inc.

Edmund Nolan, 71, founder and president, **Advance Stamping Co.**, Detroit, died Mar. 14.

Fred C. Flosi, 53, vice president, treasurer and director, **A. M. Castle & Co.**, Chicago, steel distributor, died Mar. 17.

Warren H. Turner, 51, Detroit district sales manager for **Norton Co.**, died Mar. 13.

Russell B. McCann, 55, chief engineer at the Rome, N. Y., division, **Revere Copper & Brass Inc.**, died Mar. 16 after a brief illness.

FACTS TELL THE STORY...

NEW CK MILLING MACHINE PAYS USER BIG PRODUCTION DIVIDEND

CK Milling Machine Features that helped do this job BETTER

New CK column easily absorbed vibration from heavy cutting load.

CK's large (2" dia.) screw and extra-long table feed nut permitted heavy cut.

No. 60 heavy-duty drive flange on spindle drives heavy-duty arbor with multiple cutters.

CK's positive, metered, pressure and automatic lubrication assured wear-free operation.

Greater Horsepower of CK machine meant maximum results from modern cutting tools.

CK's 3-bearing spindle and flywheel assured fastest metal removal with desired finish.

24 different spindle speeds (13 to 1300 rpm) plus 32 different table feeds (⅓" to 90 ipm) meant operator selected exact combination to get fullest advantage from high horsepower and modern cutting tools.

The FACTS on this job are:

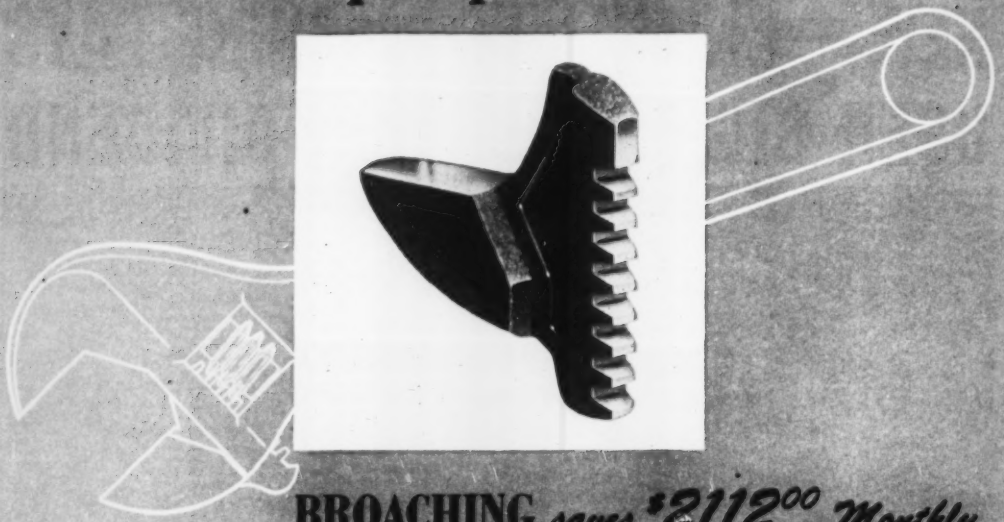
Machine: New 25hp No. 5, Model CK Plain.
Material: Cast Steel, 150 Brinell.
Feed: 4½ inches per minute.
Cutter Speed: 100 Surface feet per minute.
Rate of metal removal: 17.5 cu. in. per min.
Production rate: 4 parts per hour.
NOTE: Each part requires but a *single pass* of the cutter on the new Kearney & Trecker CK machine.

Old production rate 1½ parts per hour with two passes required per piece.

Investigate Kearney & Trecker's new CK line of milling machines. You'll find every feature is test and job-proven to give you cost-cutting results . . . greater machine capacity . . . greater productivity . . . better finished products. Contact your nearest Kearney & Trecker representative or write: Kearney & Trecker Corp., 6784 West National Avenue, Milwaukee 14, Wisconsin.

KEARNEY & TRECKER MILWAUKEE MACHINE TOOLS

Lower Cost-per-piece:



BROACHING saves $2112.00 Monthly

. . . cuts manpower needs 75%

DETROIT BROACH CAN CUT YOUR COST-PER-PIECE

by

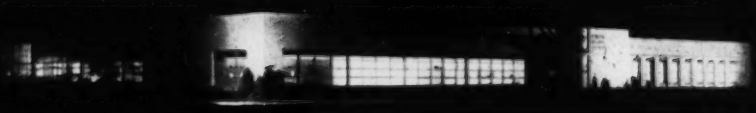
1. Developing broaching set-ups to replace other, more costly machining methods.
2. Re-design present broaches and broaching set-ups to make them more efficient.

Two milling machines and two operators per shift, two shifts a day, were required to produce the rack teeth and finish the jaw face on 8000 movable wrench jaw forgings. The Detroit Broach set-up which has replaced the milling operations produces the same number of parts with one operator, one machine, on one shift per day . . . savings in labor alone amount to $2112.00 monthly! And that's not all.

The original tool cost for the broaching set-up was lower and the cost of tool maintenance is reduced materially. In respect to quality, the manufacturer reports much better surface finish, more consistent dimensions, uniformity of parts.

If you are boring, slotting, reaming or milling *your* parts, chances are that Detroit Broach can reduce your cost-per-piece. Why not investigate today? Detroit Broach engineers will gladly discuss your operations and give you actual cost and production data on broaching them.

WORLD'S LARGEST MANUFACTURER OF BROACHES AND BROACHING TOOLS EXCLUSIVELY



DETROIT BROACH COMPANY

20201 SHERWOOD AVE. • DETROIT 34, MICH.

Production AND Engineering
NEWS AT A GLANCE

RESEARCH OUTLAY BIGGER—Research expenditures will rise from 10 to 25 per cent over 1951, but won't keep pace with sales in all companies. That's what a National Industrial Conference Board survey of 125 manufacturers reveals. Fundamental research and development of new products received more emphasis in the last five years. Research done in other than company laboratories is equally divided between commercial and college laboratories, with the colleges handling the bulk of basic research assignments. So far, only a small part of research expenditures is being made in connection with government work.

WEIGHT CALCULATIONS LIGHTENED—A new weight slide rule helps designers determine how much copper, brass, lead, steel, cast iron, aluminum or magnesium stock is required to produce a part of given size and shape. Special arrangement of standard slide rule scales on the reverse side permits direct reading of squares, cubes, square roots and cube roots.

FAULTY COMBUSTION PROBED—"Curved light" is being used by General Electric engineers in a quartz and steel probing instrument to pin-point location of flaming gases inside jet engines. The device, known as a flame detector, reaches the hidden and inaccessible sections of aircraft gas turbines by a pliable quartz filament, which although bent and twisted, transmits light through its length.

MORE NICKEL VIA PIPE LINE—Bulk concentrate from International Nickel Co. of Canada's Creighton concentrator is pumped through a 7½-mile pipe line to reduction plants at Copper Cliff, Ont. The pipe artery will handle concentrate from 3,650,000 tons of nickel-copper ore annually, cutting time needed to transform ore into refined nickel. When 10,000 tons of ore daily is milled at Creighton, about 1800 tons of concentrate and 8200 tons of tailings are produced. Water added to the concentrate makes a pulp which flows through the pipes at a rate of 800 gallons per minute. The tailing pump flows at 2500 gallons per minute.

NO HEAT NEEDED—Proposed method for cold-forging may make possible manufacture of many metal articles without preheating and machining. The process consists of subjecting a cold metal blank to rapidly increasing pressure to bring it into the plastic state. While this is taking place, energy is stored up in a resilient member of the press mechanism which is automatically released when the blank becomes plastic. This stored energy is then used to flow the plastic metal into the required shape. Volume of metal displaced may exceed 10 per cent of the total volume of the blank. The method resembles shaping operations formerly performed wholly or partly by hot-forging.

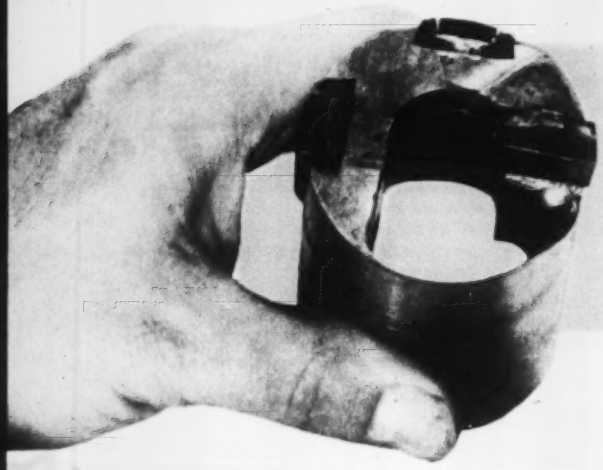
FASTER PRECISION MACHINING—A device with an electronic finger is speeding up as much as seven times precision machining of metal parts. The electronic robot, developed by Raytheon Mfg. Co., Waltham, Mass., feels the contours of a master pattern; hundreds of parts, exact duplicates of the original are machined in less time than is needed to machine them manually.

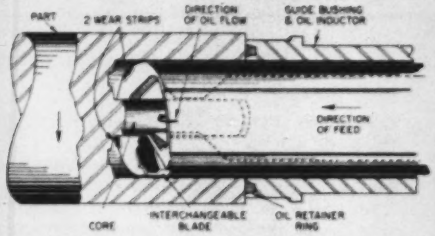
LONGER TOOL LIFE—Hardness, low coefficient of expansion, nongalling properties and corrosion-resistance—all contribute to chromium plating's popularity as an engineering material. Life of certain cutting tools may be prolonged by plating their cutting edges. Plate thickness should be about 0.00005-inch, not sufficient to dull edges, but ample for flutes. Chromium plating is used to best advantage on tools that take a light cut. p. 76

VACUUM METALIZATION—Eastman Kodak has a new process for high-vacuum metal coating of plastics. The method applies a nontarnishing abrasion resistant finish to a plastic, metal, or other relatively nonporous base material. Object is first coated with lacquer and baked to provide a suitable undercoat. Then the thin metal finish goes on under high vacuum and another coating of lacquer applied. Special surface finishes such as metallic colors and a brushed, hammered or wrinkled effect can be produced. The process is clean and does not use dangerous or expensive liquid chemicals.

BORES TREPANNED FASTER—Deep hole boring machines or lathes can be converted for trepanning, an effective method of machining accurate bores in metals. Time saving by deep hole carbide trepanning may be as much as 95 per cent. Saving accrues from higher cutting speeds, faster feeds. Center of the piece is removed as a solid core. p. 74

PUT 'ER THERE!—An elecronic clock that measures time in "shakes" instead of seconds or minutes can measure intervals of one-fifth of a billionth of a second or one-fiftieth of a shake. A shake is defined as one one-hundredth of a millionth of a second. The clock operates instruments that give information about atomic explosions before the instruments are destroyed.





Above—Cutaway diagrammatic sketch showing the trepanning head slightly retracted after starting a cut

Typical trepanning head used for boring gun barrels

CARBIDE TREPANNING . . .

Accurate Bores In Record Time

Phenomenally quick process removes most of the inside diameter as a solid core instead of chips. Present boring machines can be converted for trepanning operations

By FRED W. LUCHT

Development Engineer
Carboloy Department
General Electric Co.
Detroit

HIGH SPEED, tolerances within a few thousandths and great time savings are a few of the reasons carbide trepanning is gaining prominence for machining accurate bores in metals. Trepanning removes center of piece as a solid core and produces holes up to $4\frac{1}{2}$ inches in diameter, 30 or 40 feet in length with concentricity and diameter tolerances of high accuracy.

Saving in time by deep hole trepanning may run as high as 95 per cent. Saving results from higher cutting speeds, faster feed rates and the fact that far less metal must be removed in the form of chips.

A steel forging 18 feet long, rough turned, had a 2 3/16-inch hole produced for its entire length. Feed was 0.008-inch per minute, speed 550 surface feet per minute (747 rpm) at outer edge of tool. Hole was held within 0.003 for size and 0.012 for alignment. At speed and feed used, total feed was 6 inches per minute. Cutting time was only 36 minutes. This compares with an established drilling time of 15 hours when using high speed steel spade drills including time required for three drill changes.

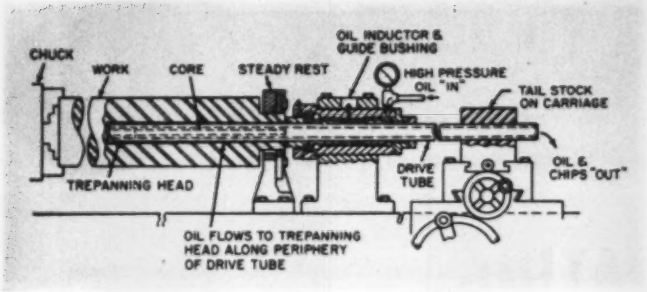
Adapting Boring Machine—At present few machines built in this country are designed specifically for trepanning work. However, it is possible to convert existing deep hole boring machines or lathes for this work.

Adequate motor horsepower is important—46 hp is required for example given. Sixty hp or more is desirable for good performance, depending on hole size and material. An oil pump capable of delivering 25 gallons per minute or more, at a pressure of at least 175 psi, was required for the above mentioned job.

Volume of oil required varies with hole size. A carriage fixture is needed to support and permit accurate feed of the tube on which the trepanning tool is mounted.

Also required are oil inductor bushing and support to provide oil seal at the entrance end of the bore. Electrical controls and indicators should be near point of chip outlet. Recommended are variable speed control for motor, gearless headstock, cutting fluid temperature and oil pressure gages. High horsepower requirement is due to the ability of carbide to remove chips rapidly. While 175 psi is given here as a minimum for oil pressure higher values often are desirable. Much trepanning has been done at pressures as high as 200 to 400 psi. Higher pressures require better oil seals.

Needs High Oil Pressure—High oil pressures are required because cutting fluid must effectively wash out chips rapidly. Fluid must flow rapidly enough to prevent marked rise in either cutting fluid or work temperature, and must provide adequate lubrication and cooling for the carbide wear strips. Cutting



Schematic drawing of a deep-hole boring machine converted for trepanning

fluid with 10 per cent sulphur base is frequently used.

Uniform control of tool feed presupposes accurate lead screws to feed tool into the work as it revolves. If a machine adapted to trepanning has been used for one length of work requiring carriage to move over same place many times, lead screw has probably worn in this spot and should be replaced to insure uniform feed over the entire travel of the carriage.

Trepanning cutter head is attached to the nonrevolving drive tube. Two types of cutter blades are used, a $\frac{3}{4}$-inch cutter blade for holes $1\frac{3}{4}$ to 8 inches. Blades $1\frac{1}{4}$ inches wide have been successfully used for trepanning large sized bores. With $\frac{3}{4}$-inch blade, oil is fed under pressure to cutter head through the space between drive tube and inside diameter of the hole and is discharged along with chips through space between inside diameter of tube and core. With larger blade, flow is reversed. Discharge of cutting fluid and chips around periphery of the drive tube is advisable when trepanning larger holes.

On typical cutter head illustrated for holes 8 inches or less in diameter requiring a $\frac{3}{4}$-inch blade the carbide cutter blade and carbide wear strips project slightly beyond outside diameter of head. Passage for the coolant to the cutting area is provided.

Detail design most satisfactory for $\frac{3}{4}$-inch wide cutter blades is illustrated. Chips must be broken up as small as possible for ready washing out by cutting fluid. Cutter blade has three cutting edges producing three separate chips. Center portion of the cutting edge "leads". Two sides follow.

Quick Chip Washout—Best material for the wear strips and tips appears to be grade 78. Cutting speed range from about 600 sfpm for steels in the 200-250 Brinell range to approximately 400 sfpm for those up to 400 Brinell.

Feeds of 0.006 to 0.010-inch per revolution work very well. Best feeds for each job may require modification. Important thing is to produce a heavy chip. This reduces cutter blade wear. Chips, however, should be broken up until they can pass freely through discharge space. Feed should not be reduced if speed is increased or vice versa. In some instances coolant pressure must be increased to flush chips out properly, especially when nearing the end of deep holes.

It is important that the correct cutter blade grind be secured right at the start. Wear strips are cylindrically ground in position before inserting the blade. Cutter blade is also cylindrically ground to a slightly larger diameter.

Chip breaker size should not be changed when speed changes. Trepanning speed depends on material machined. With materials of 275 or 375 Brinell, cutting speeds of 500 to 600 sfpm (at bore diameter) work well. Higher speeds may be used for materials of lower hardness.

Trouble may be experienced from extremely fine particles carrying through the conventional filter. A special filter employing Carboloy permanent magnets keeps chips from getting into the pump where they cause rapid wear.

Engineering Skill Wasted

Survey shows firms plan management jobs, but fail to prepare engineers

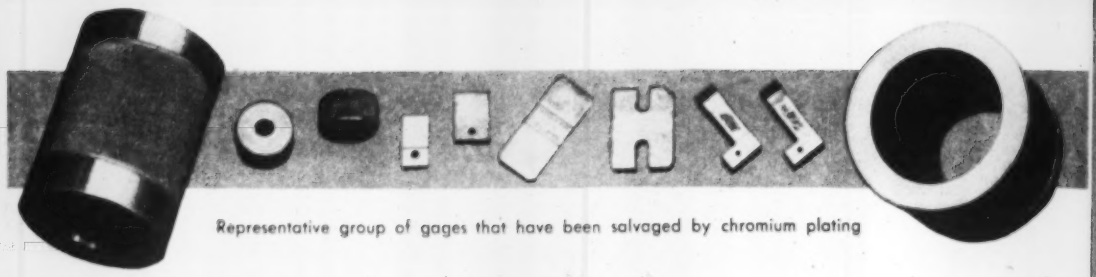
ESTIMATED 60 per cent of potential engineering managerial talent is wasted through poor communications between engineers and top industry management. This was revealed in a nationwide survey reaching 350 industrial companies employing about 50,000 engineers. A 48-page report on the research, conducted by National Society of Professional Engineers, offers the summary in an effort to help correct this situation.

L. L. Dresser, society president, says the study shows 99 per cent of the firms have engineers in top executive positions and 92 per cent look to their engineers for future leaders. Despite this, only 34 per cent reported any planned program of information and indoctrination designed to ready these men for jobs they are destined to fill.

A further paradox revealed by management practice is seen in the report that 88 per cent of the firms questioned seek opinions and suggestions from engineering people on problems of general management. In the same breath, nearly half stated they were dissatisfied with their present communications setup.

Query on how many companies receive requests from engineers for information on management policies brought affirmative replies from 86 per cent. Breakdown of these requests indicates the technical men have their own and their employer's progress topmost in mind. The four topics generating the most concern were opportunities for advancement, expansion plans, new products and technical trends. Creating the least interest were benefits and security, sales promotion, sales and earnings and corporate organization.

The report, titled "How to Improve Engineering-Management Communications," is the first of a series of executive research projects initiated by the society. Their purpose will be to help alleviate the shortage of engineers by assisting industry to secure most effective use of present personnel.



Representative group of gages that have been salvaged by chromium plating

CHROMIUM PLATING...

New Life for Worn Parts

Gages, worn bearing surfaces, cutting tools are likely candidates for the hard chromium plating treatment when wear threatens to end their useful life

VALUABLE properties of chromium plate its hardness, low co-efficient of friction, nongalling properties and its good resistance to corrosion. Chromium also has good resistance to heat, remaining unaffected at temperatures oxidizing other metals.

A chromium plate found satisfactory for engineering use has a hardness of approximately 825 Vickers Brinnell. Hardness above 1000 Brinell has been obtained, but accompanied by an increased brittleness that would limit its applicability.

Salvage for Gages—Any wearing surface can be improved by chromium plating. Many gage manufacturers now plate new gages, but largest part of gage plating is a salvage operation providing long, consistent wear life. Plating can be easily stripped from the steel permitting replating an indefinite number of times.

Nutmeg Chromium Corp., Hartford, Conn., grinds gages about 0.003-inch undersize, plates them 0.003 to 0.004-inch oversize, then grinds and laps the gage size. A good, hard, low friction surface is reported extending the gage life three to seven times.

For new gages there are two schools of thought. One calls for a light plate of approximately 0.0001-inch. The method is to lap 0.00005 to 0.0001-inch undersize, plate 0.00015-inch oversize, then lap to size. It is desirable on close tolerance gages because they can be replated economically. The two grinding operations necessary for the heavier deposit method are eliminated and the double lapping substituted.

Longer Tool Life—Life of certain tools may be prolonged by plating cutting edges. Chromium plating can be used to advantage only on tools that take a light cut. Thickness of plate should be confined to approximately 0.00005-inch, not sufficient to dull edges, yet ample for flutes. Heavy build-up of chromium plate on tools generally leads to inferior service life.

Stress relieving of plated cutting tools is important. Plating accentuates stresses and causes cracking unless corrective measures are taken prior to the chrome operation to alleviate this condition. Temperatures to use vary according to type of steel. Bake after plate to remove occluded hydrogen should be 350° F for 3 hours in either oil or air.

CYCLE FOR PLATING CUTTING TOOLS

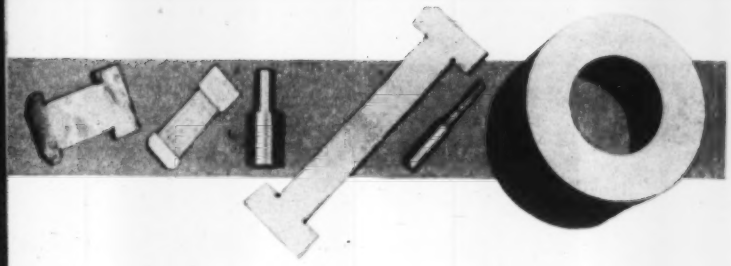
—Heat treat, 600° F or higher, depending on type of steel
—Anodic clean, 12 to 16 oz./gal cleaner at 6 volts
—Water rinse
—Immerse in 50 per cent hydrochloric acid at room temperature
—Water rinse (thorough)
—Chromium plate—5 minutes average on new tools
—Bake—350° F., 1 to 3 hours

Saves Wearing Parts—Spindles, shafts, pistons and machine parts subject to wear or scuffing can be salvaged by chromium platings. These salvaged parts outlast the originals. Journals on large rotors are salvaged by grinding out score marks, plating oversize, then grinding to size. One company decided to find out if these parts lasted longer after plating and discovered a plated rotor never comes out for repairs. Plated shafts outlived the motor with still no indication of failure.

Many aircraft parts and assemblies are hard chromium plated. Where oil retaining surfaces are needed, porous chromium is used. In this type of hard plate, crack structure is carefully controlled to retain friction-reducing oil. Front and rear bearing units center bearing section and the spline widths of used aircraft crankshafts may be salvaged by plating. Master rod caps, propeller shafts are salvaged in a similar manner.

Less Maintenance—Hard chromium has contributed to steel mill maintenance benefits. Application of chromium plate to 500-ton press ram greatly increased its useful service life. Also, saving was made in leather packings. Packing for a new cast iron ram lasts about a week when ram is ready to be taken out of service. Packing must be renewed every day. On a chromium plated ram leathers last five to six weeks. Due to spare parts shortage, a multiple radial drill press was disassembled and all worn shafts and gear bores were chromium plated and finished to size. Press gave trouble-free service with little maintenance.

Air hammer pistons, normally



replaced in six weeks, after chromium plating, last as long as 15 months. Chromium plating eliminates sticking that occasionally occurs after storage of the tool and reduces wear on the sleeve. Adjusting outside diameter of the sleeve, it was found to be unnecessary to stock nonstandard sleeves. Only standard pistons were needed, since their diameter could be plated to conform to refinished sleeve bores.

Life of a chromium-plated machine parts may be extended indefinitely by electrochemically stripping the chromium worn beyond tolerance limits and then replating. Stripping can be accomplished without harm to the original steel surface. Results of studies on fatigue properties of chromium plated aircraft parts have been reported by the National Bureau of Standards.

Baths — Commercial chromium plating makes use of two typical formulae with sulphate catalyst:

400 g/L (53 oz/gal) chromic acid (CrO_3)
4.0 g/L (0.53 oz/gal) sulphate (SO_4^{--})
250 g/L (33 oz/gal) chromic acid (CrO_3)
2.5 g/L (0.33 oz/gal) sulphate (SO_4^{--})

Concentrated bath is the former, second formula is the dilute bath. Maintenance of the right ratio of chromic acid to catalyst is essential. For the sulphate catalyst baths, it is expressed as the ratio of CrO_3/SO_4. Ratio should be kept within the range of 50/1 to 250/1. In industrial plating, ratio is kept close to 100/1.

A chromium plating process developed by United Chromium, Inc., is reported to have several advantages for hard chromium plating. Baths of system are referred to as self-regulating, high-speed chromium plating baths or simply the "S.R.H.S." baths. Baths are chromic acid solutions with mixed and co-operating catalyst acid radicals in controlled concentration. Control of the chromic acid content results from additions of S.R.H.S. compounds based on hydrometer readings or on analysis. Two baths of this type are in use: One generally operated at a density of 21°Be' and the other at 31°Be'.

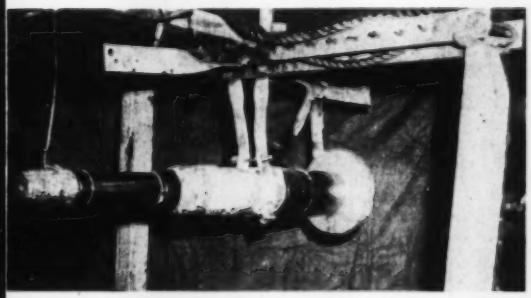
Super Solution — Cathode efficiencies of the S.R.H.S. bath are one-fifth to one-half greater than those of ordinary chromic acid-sulphate baths, making possible substantial saving in plating time. Another advantage is its leveling action. Bath smoothes minor surface irregularities. Less final grinding of the deposit may be required. Bath deposits are reported to show less nodular growths, treeing and pimpling. It is reported to be valuable for chromium plating on cast iron.

Where it is important to avoid such surface roughness and where high plating speed is desired with a minimum build-up on unprotected high-current density points, the S.R.H.S. baths of higher concentration have been found especially suitable.

Work has been conducted by R. M. Wick of Bethlehem Steel Corp. to develop a high-speed chromium plating bath for engineering use. Process achieves high current densities with a chromic acid plating bath containing a high concentration of sulphate radical in conjunction with a high temperature. Bath contains 275 g/L chromic acid and 5 g/L sulphuric acid, at a temperature of 70° C. Current of 1000 to 3000 amp per square foot reportedly can be used with this solution. Chromium plate produced is particularly suited for mechanical use, especially in its resistance to impact.

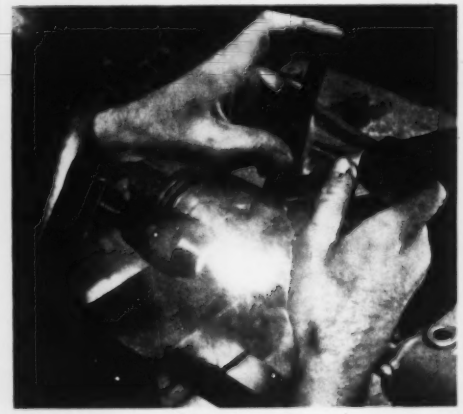
Right—Masking auxiliary anodes on aircraft crankshafts before chrome plating bearing journal areas

Below—Large machine shaft will be salvaged for further use by heavy chromium plating the worn areas

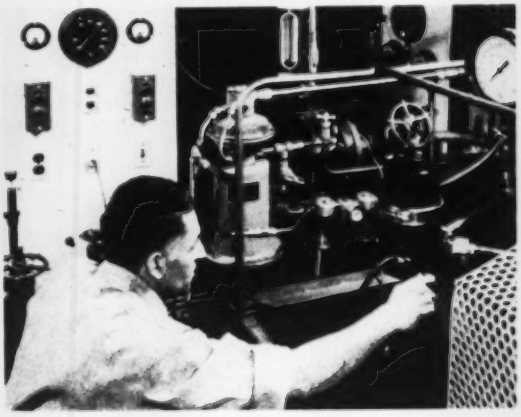


Machine operator uses 28 gages to inspect 17 interior surfaces of an aluminum carburetor body

Diamond point of profilometer seeks out scratches left by fine abrasives, indicates their depth on meter



Discharge of argon around welded area prevents oxidation of metal during welding of stainless tubes



Reheat fuel filter, which helps give a plane superspeed, starts performance test that continues for one hour

Better Than Watchmakers

Intricate jet engine parts call for variety of close-tolerance operations, corrosion-resistant metals, precision inspection

FABRICATING jet engine fuel nozzles and other specialized jet engine fuel system valves at jet engine division, Parker Appliance Co., Cleveland, is exacting work. Working surfaces are finished accurately to one ten-thousandth of an inch; ten times watchmaker's precision.

Company uses variety of metalworking operations to turn out these parts, including forging, casting, welding, stamping, coining, brazing, grinding, lapping, honing, turning, broaching, milling, drilling, and rubber molding. Materials are aluminum alloys, high-alloy stainless steel, and synthetic rubber formulations.

Almost 4000 precision assemblies are produced monthly. Each unit is comprehensively inspected and tested by company personnel and resident Air Force inspectors. Jet engine division works three shifts daily, and is rounding out its fifth year of jet parts production.

Special Editions of Standard Machines Ease Shortage

Standard machines adapted for special jobs offer possibility of better delivery. Machine will be usable for peace time products. Initial cost is relatively low

TOOLING ingenuity can adapt standard milling machines to production lots, retaining the machine's flexibility for conventional work. Cincinnati Milling Machine Co.'s files list numerous applications like these that follow in which the company was able to adapt standard machines to volume lots.

Spindle carrier and rise and fall unit of a No. 0-8 automatic are mounted on a special base, supporting an antifriction table unit. Six clamps hold the work to the upper part of the fixture, which can be rotated or indexed as desired.

The swivel section of the unit is lever-locked during the cutting cycle. Locating plunger engages previously formed slots in the ring. Operation consists of milling expansion slots at the tip of the grooves. Machine automatic rise and fall unit feeds down at 1-inch per minute.

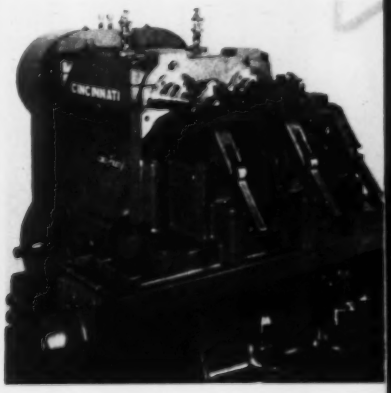
Two Spindles—In another case the overarm of a standard No. 1-18 plain automatic milling machine is replaced with a two-spindle horizontal milling attachment for milling the flats on the flanges of intake manifolds. Attachment spindles are gear driven from the machine spindle, and run in opposite directions at a speed of 95 rpm. Spindles are quill mounted for convenience of cross adjustment. The machines automatic spindle stop and automatic backlash eliminator increase the safety and efficiency of the setup. Part is made from cast iron.

Special equipment mounted on a standard machine incorporates automatic retraction of all cutters. It combines two milling operations in one pass. Machine is a No. 46-72 hydromatic, equipped with two individually motor driven vertical heads mounted in the overarm dovetail bearings. Vertical attachment spindles are offset from the machine spindles by an amount sufficient to clear 11-inch diameter face mills with 5-inch slotting cutters. Both types of cutters have sintered carbide teeth. Each head is automatically retractable $\frac{3}{8}$-inch in a horizontal plane. Machine spindles also automatically retract. Fixture is manually operated and holds two cast iron parts.

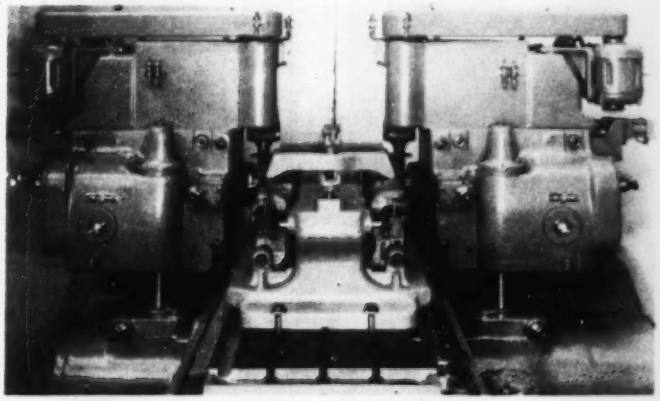
Such special adaption of standard machines can offer better delivery than would a special machine, and at a lower cost.

Special indexing table holds ring for milling expansion slots. Locating plunger engages previously formed slots and table is locked with lever

Two-spindle horizontal milling attachment mills flats on flanges of intake manifolds. Quill-mounted spindles run in opposite directions at 95 rpm



By offsetting vertical spindles, cutters will clear the horizontal face mills. Camshaft housing gets two milling operations performed on one pass



Surface Finish Control Improved

Joint development of two major automotive companies will eventually consist of 18 surfaces ranging in roughness from 5 microinches average deviation to 500 microinches

ESTABLISHING new precision reference specimens for surface finish control was described at the American Society of Tool Engineers meeting in Chicago on Mar. 19 by D. R. Lewis, Chrysler Corp., and A. F. Underwood, General Motors Corp. Purpose of the joint development is to establish a method of standardization for the production and distribution of accurate and reproducible physical standards of surface roughness to perform much the same function for roughness measurements as the Johanssen gage blocks do for dimensional control.

Surface profile finally adopted after some experimentation consists of a series of planes inclined to each other at an angle of 150 degrees. The height of the profile is made at a series of definite values corresponding to the preferred roughness values adapted by the American Standards Association. The spacing is fixed by the profile height and the angle, and increases in direct proportion to the roughness.

More Coming—At the beginning of this project plans were made to produce a series of 18 surfaces ranging in roughness from 5 microinches average deviation from the mean to 500 microinches. Of these 18 projected specimens, approximately half have been made. At the present time only five roughness values are available commercially, covering a roughness range from 20 to 125 microinches. These specimens are used for the calibration of surface roughness measuring instruments.

When this project was first planned, a number of production methods were discussed, but the most suitable appeared to be the use of a ruling machine such as those employed for the manufacture of diffraction gratings. A number of test rulings were made on the ruling engine operated by the physics department of the University of Michigan which indicated that machines of this type would be capable of producing the desired surfaces. After some experience had been gained in the use of this ruling machine, a specialized machine for this project was designed and built by Research Laboratories Division, General Motors.

Way It's Done—Ruling is done by a specially shaped diamond supported by a pivoted and counterweighted arm. Work is reciprocated under the diamond by a planer type movement, the reciprocating table being floated on oil. Ruling is done only during the advance stroke; a mechanism being provided to lift the diamond from the surface during the table return. During this return stroke, a lead screw is rotated by a magnetic indexing mechanism to advance the diamond into position for the next ruling stroke.

Since originally built, this machine has been modified extensively to improve its operation and at the present time gives very reliable and reproducible results. It is capable of ruling lines of pitches as fine as 10,000 to the inch and as coarse as 300 to the inch. Since the desired number of lines per inch is determined by the angle and depth of the surface contour, it has been found necessary to provide three toothed wheels for lead screw indexing of 500, 419, and 268 teeth respectively. These three wheels enable rulings to be made of all the desired roughness values having pitch errors which exceed 10 microinches in only one case.

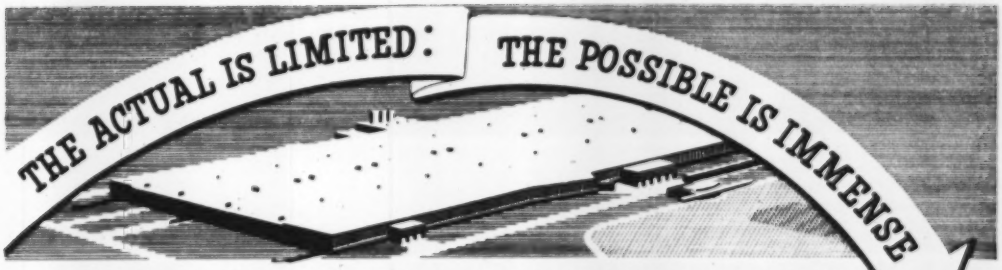
Fenced-in Composition

Simple dam that supports granulated welding composition facilitates rebuilding crawler tractor rollers. On these rollers, submerged arc method cannot be used without retainer for composition. Linde Air Products Co.'s Unionmelt equipment is mounted in a stationary position over the roller

Material Requirements—Some early experiments in ruling surfaces on steel and on nickel served to establish the requirements for a suitable material for this work. It was found that the ruling process did not remove any metal but rather embossed the lines in the material being ruled. To ensure uniform surface contour, a highly ductile material was required. The material must be capable of taking a high polish in order that all surface irregularities could be eliminated in preparation for ruling.

Only material found suitable for this work is pure gold. The early work done on the project used an electroplated layer of gold, hand polished to the desired degree of smoothness and flatness. It was found that in spite of statements in metallurgical textbooks gold is susceptible to cold working, so that the hand polishing operation introduced varying degrees of hardness over the surface of a single blank. With gold surfaces prepared in this way it was difficult to obtain uniform rulings. After a long series of experiments to try to improve this condition, it was finally discovered that gold rolled on a steel backing could be made sufficiently smooth and homogeneous to give high quality surfaces.

Replica Problem—Study of the problem of obtaining in quantity highly accurate replicas of the original gold surfaces was undertaken by the Electroforming Division, U. S. Rubber Co., now a part of the F. A. Ringler Co., New York. The problem was to devise a method of electroplating in which the deposited layer has sufficient adherence to the gold to follow the surface contour to an accuracy



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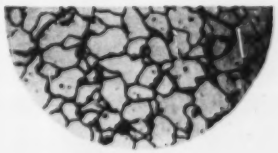
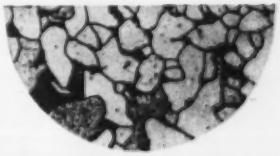
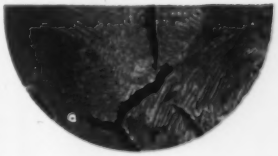


WELD METAL



MILD STEEL



CAST IRON

The photomicrographs show why welded steel is superior to gray iron. Fine grain sizes for both steel and weld metal account for steel's greater strength as compared with the graphite flakes that limit tensile properties of iron.

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on the order of 1 microinch, and which later could be stripped from the gold without either mechanical or chemical damage to either surface. Solution of this problem required several years of experiment and development work but now is solved satisfactorily. The replicas which are to be used are made of pure nickel.

Replicas which are available commercially are negatives of the original gold surface and are five generations removed from the original ruling. This has been found necessary since each duplicating process involves trimming the edges of the original sample in order to part the duplicate from the original.

End product of the duplicating process is given a very thin (1 to 2 microinches) coating of rhodium for additional corrosion and abrasion resistance. The hardness of the specimen is approximately 35

Another Poser—Measuring the surface contour of the specimens and determining how closely a given ruling corresponds to the intended contour also demanded considerable development before accurate results could be obtained. The depth of ruling of the finer specimens is of the order of a wave length of light, so that a direct optical examination of a cross section of a specimen is not practical. The basic approach used for measuring the surface contour of these specimens is the method of taper sectioning originally suggested by H. R. Nelson of Battelle Memorial Institute. If, instead of a vertical cross section, one making a small angle to the original surface is used, an added apparent magnification in one direction can be obtained. This added magnification is inversely proportional to the sine of the taper angle, and if small angles are used can be made significantly large. In calibrating these specimens an angle of approximately $2^1/_4$ degrees is used, giving an added vertical magnification of 25 times. This is sufficient to enable accurate measurements to be made with an optical microscope.

At present, the available set of precision reference specimens consists of five blocks, the 20, 32, 50, 80, and 125 microinches. They are measured in arithmetical average. This group allows the calibration of surface roughness instruments at sufficient points on the scale (or scales) to check the accuracy of the readings.

Care Required—Before using the blocks, they should be wiped off with a soft cloth to remove hard particles which could cause wear and damage. Although the surfaces are protected by a thin over plate of rhodium, it is possible to injure them by dirt. Care must be taken to use only sufficient pressure to give good contact when applying the stylus or other device to calibrate the instrument. Too high a pressure will burnish down the peaks of the roughness rulings.

Blocks are extremely simple to use. The instrument to be checked is operated in exactly the same manner as specified for measuring the roughness of a machined surface and the meter reading is noted. With every set of blocks is a table showing what each roughness block should read depending on the radius of the diamond stylus and to take account of any other necessary corrections.

Before adjusting the meter, it is necessary to check the diamond for bluntness or chipping. This is done by reading the meter on the 80 or 125 block and on the 20 block. If the same correction factor is not applicable to both measurements the diamond is likely to need replacement. Thus, if the 125 block reads 120 while the 20 block reads 10, it is likely that the diamond is damaged. The instrument may also have lost its linearity. Under such circumstances the device must be properly serviced before any minor adjustments can be made or correct readings taken.

It is essential to give consideration to how closely the meter should read to the values shown in the table accompanying the precision reference specimens. The readings are being taken in millionths of an inch and small changes in the stylus, the instrument mechanism, the block (such as wear) or variations in operation can readily make appreciable differences. It might be pointed out that measuring blocks of the Jo-block type are accurate to within plus or minus 4 millionths of an inch in the best commercial grade. On very smooth surfaces of say under 5 microinches, the stylus cannot possibly read the correct value as it cannot penetrate to the bottom of the scratches.

Practical Factors — In actual practice, nearly all machined surfaces are so variable in their roughness over even an $^1/_8$-inch trace that it is impossible to judge the roughness value precisely. Therefore, the possible difference between a meter reading on a precision reference specimen and the value appearing in the table is not likely to cause concern unless, the difference is obviously large.

Instruments of the electrical pickup type require a tracing speed within limits prescribed by the manufacturer. To obtain correct readings from the blocks, the stylus must be drawn over them in accordance with such instructions. If the instrument is known to be in good condition, the precision reference specimens can be conveniently used to practice the speed of trace. As an example, selecting a 50 block, the stylus is moved at varying (but reasonably approximate) speeds. It will be observed that at too high or too low speed, meter reading will drop off.

Blocks can be used to see if the instrument is in good repair without the complication of tracing speed. If a mechanical tracer is available, it will give the proper motion to the stylus.

The blocks are made to calibrate any instrument which reads the average depth of the surface roughness. Certain roughness meters read by light reflection from the test surface. The precision reference specimens are not intended for use with such devices as the percentage of reflected light is not dependent on the roughness.

Devices employing other means for indicating the roughness should be investigated by trial to determine if the blocks are suitable for calibration purposes. It must be pointed out that the precision reference specimens cannot be used for tactual (such as running a finger nail over the surface) or visual inspection. These blocks do not have the character of commonly machined surfaces and do not have the "bite" which is typical of machined surfaces.

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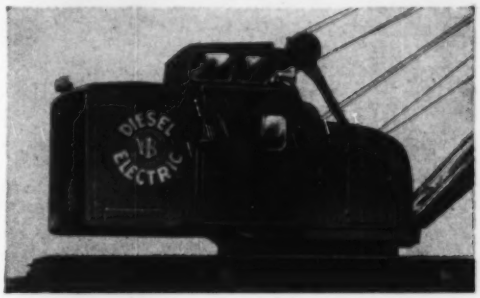

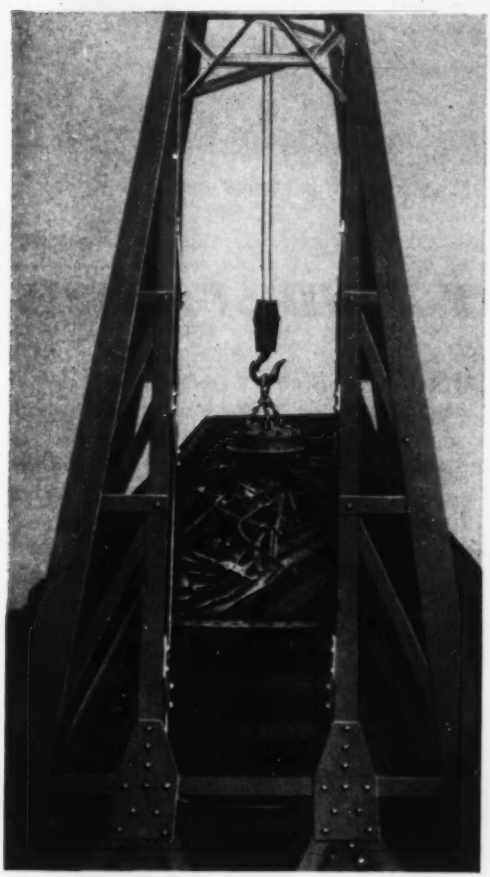

Mounted high in the crane and surrounded by large windows, the operator in a Brownhoist patented Monitor-Type cab has full 360° visibility – forward, backward, and to both sides – providing safer operation, faster, more efficient loading and unloading. In addition the new Clear-Vision Boom is another Brownhoist feature that permits the operator an unobstructed view of his work. When unloading from high-walled railroad cars he can see right into the car.

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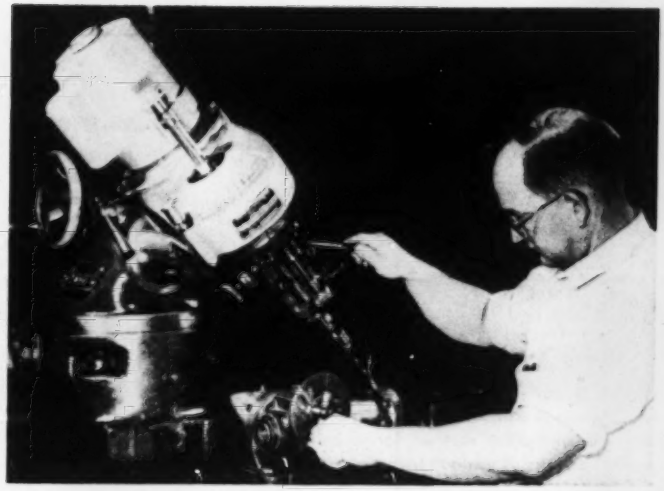


Totally-enclosed, fan-cooled, ½-hp form G motor mounted on a machine tool. Motor can be rotated in any position and still retain its operating features

Curtain Lifted on FHP Motors

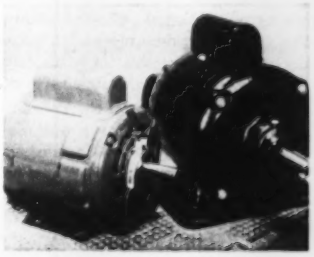
New line of fractional horsepower motors from GE features less weight, smaller size and modern appearance. Increased versatility is one benefit of the redesign

COMPLETELY revised line of fractional horsepower motors is announced by the General Electric Co., Schenectady, N. Y. New line motors are more modern in appearance, lighter in weight, smaller, and more versatile than their predecessors.

Some motors weigh 51 per cent less per horsepower than those they replace. Weight reduction is achieved with flat, dish-type end shields, aluminum rotor windings and fans. End shields are reinforced to give extra strength and keep shaft in alignment. Cast-in ventilating fins protect personnel and provide ventilation without adding weight.

Bearings Protected—Smaller in size than previous models the motors conform to all NEMA standards. Easier mounting and less waste space are the benefits. Motors may be mounted in any position. Large oil supply and special lubrication system protect sleeve bearings against wear and prevent loss of oil regardless of position of the motor. Ventilating fans and baffles keep a continuous flow of cooling air over insulation, and the nylon insulation itself has extra long life. Steel cradle base, locking latches and end shields maintain shaft alignment. Provision is made for easy relubrication.

Available in both open dripproof and totally enclosed fan-cooled models, motors are made in types K polyphase, KC capacitor start, KH split phase and KCP permanent split capacitor. They will be offered in a complete range of standard horsepowers, speeds, voltages and frequencies.



Comparison of one of GE's new TEFC motors (left) with its predecessor of equivalent rating. Smaller in size it may weigh 50 per cent less

Designated as form G the new design comes at a time when GE anticipates a great increase in demand for fhp motors. About 50 per cent of the motors are used in industry. The rest are in the home. It is for this multiplicity of purpose, drills, fans, washing machines, conveyors, that the versatile form G is designed.

Nickel-Aluminum Bond Succeeds

Synthetic rubber compound is being used successfully to establish a bond, previously unattainable, between aluminum and nickel plate. Development of the process for nickel-coating aluminum was announced jointly by Hamilton Standard Division of United Aircraft Corp. and Bart Laboratories Inc., Belleville, N. J. The companies say their process solves a major problem in coating aluminum with nickel to give a stress-free, hard, yet resilient surface.

Plating process was developed for the Air Force and Navy to protect duralumin propeller blades from pitting and eroding effects of spray thrown up in sea landings and takeoffs. Solid duralumin propeller blades equipped with the coating already are in service on the Navy's Martin P5M-1 flying boats and the Grumman UF-1 utility amphibians. After several hundred landings and takeoffs, nickel-plated blades emerged unscathed while unplated blades were damaged.

The process is called Alni-Clad. Its key, the bond between the organic synthetic base and the nickel has high tensile strength or adhesion to stand up under a wide range of temperatures. Bond material is sprayed onto aluminum to required thickness. After drying, the piece is plated by conventional means to required thickness. Present facilities permit a component to be clad in about 24 hours.

Bart reports satisfactory results with all aluminum alloys used to date. Finished pieces have a hardness of 400 to 450 Vickers and are stress-free. They have a semi-bright surface that can be polished to a high luster.

By CHARLES E. AGNEW
Consultant
Blast Furnace and Sintering Plant Operations
Cleveland

BLAST FURNACE PRACTICE

VIII—Slag Composition Research

A combination of furnace reactions and disclosures on slag mineral compositions is of greater value than any other method for visualizing thermal conditions within the furnace. Findings of various investigators serve as valuable contribution to practical furnace operation

THEORETICAL and actual furnace practice data which has been presented in previous articles of this series has stressed importance to furnace operating economy of ratio to each other of slag forming constituents contained in burden materials. These ratios are of major importance in determining thermal conditions within the furnace and overall economy of the operation.

With conditions which now prevail in United States blast furnace raw material reserves, there is no phase of furnace operation which merits greater attention on the part of management, the raw material agent and the furnace operator, than slag composition. Management and the raw material agent must supply the materials; the furnace operator can use only what is made available to him.

Because of the urgency of the problem a short review of some steps in past slag research may be of interest and may help to create greater interest in the subject than normally exists.

Source of Raw Materials — For approximately 75 years the great majority of furnace plants in the United States have drawn their raw materials from Lake ores and middle west coals. Any combination of these materials in a furnace burden had the natural ratios of gangue constituents which permitted production of slag with the chemical composition closely approaching the theoretical ideal. Consequently, slag mineral composition was naturally favorable to the preferred thermal effects within the furnace and to the thermal economy of the operation. During recent years the quality of these natural raw materials has deteriorated. With the present and prospective need for beneficiation of naturally lean ores and high-ash coals, the natural ratios of gangue constituents to each other frequently are altered to the ratios which are unfavorable to the ideal slag formation.

Beneficiation methods, which wash lean ores to increase the iron content, frequently wash out a greater percentage of alumina than silica. Consequently, new ratios of gangue constituents are created which are unfavorable to the formation of slag having the preferred thermal effects within the furnace. Some methods (magnetite ore concentration) usually improve the silica/alumina ratio of the natural ore.

In any field of research one discovery frequently leads to another and one investigator may carry on from where an earlier ceased. Because of this and of conflict of opinion between investigators, confusion may be created in the minds of students of the research. But a study of the several steps of research provides a broad viewpoint and a better understanding from which findings most valuable to practical operation may be selected.

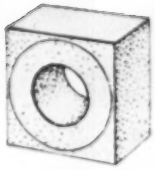
Minerals Undergo Study — In 1915 Rankin and Wright[11] published their findings regarding formation and melting temperatures on minerals. In 1916 Field[12] reported his initial findings regarding slag viscosity. In the paper he says, "The viscosity of blast furnace slag had not been measured prior to the investigation described." In 1918 Field and Royster[13] report more fully on the investigation described in technical paper No. 157. With the paper they present a viscosity-temperature table which they believed would be of value to the practical blast furnace operator.

The following statements appear in technical paper No. 187:

1. "The most important conclusion to be drawn from the results of the investigation is that slag, even when melted and completely converted to a liquid, is composed of relatively complex compounds of lime, alumina, and silica and not of a simple mixture or solution of the constituent oxides CaO, Al_2O_3, and SiO_2."

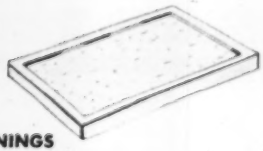
"Although this discovery will ultimately necessitate a revision of ideas commonly held regarding the chemical properties of slags, it does not in any way enter into the practical use of the temperature-viscosity table presented in this report, wherein values are referred to the relative amounts of lime,

There's no end to the uses of economical
B&W KAOCAST



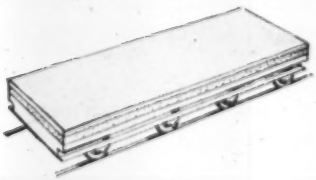
BURNER BLOCKS

Kaocast lasted 3 to 6 times as long as previous refractory. Still going strong.



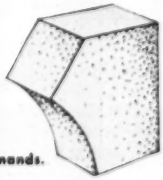
DOOR LININGS

Kaocast lasted 3 to 6 times as long as previous refractory—cut installation cost in half.



TUNNEL KILN CAR TOPS

Ordinary fireclay crumbled after few trips. Kaocast lasted 30 trips without deterioration.



SPECIAL SHAPES

Kaocast special shapes cast over week-end to meet production demands.

BOILER FURNACE REPAIRS

One power plant keeps a ton of Kaocast on hand for miscellaneous repairs because it is so versatile.

The list of plants who are discovering new, cost-saving uses of versatile B&W Kaocast keeps growing all the time. The reasons? This unique 3000 degree refractory castable can be molded in a hurry . . . cast directly in place . . . applied with a cement gun. It eliminates the need for a large inventory of special shapes. It has high resistance to spalling, low volume change, practically no reheat shrinkage. Want to know more? Ask your B&W Refractories Engineer—or write for Bulletin R-22.

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TABLE XVII

SLAG MINERALS AND OXIDES FROM WHICH THEY WERE FORMED

	Molecular formation	Oxide composition, %				Melting temp., °C
		SiO_2	Al_2O_3	CaO	MgO	
Akermanite	$2CaO—MgO—2SiO_2$	44.07	.....	41.14	14.79	1458
Anorthite	$CaO—Al_2O_3—2SiO_2$	43.19	36.65	20.16	.....	1551
Calcium bisilicate	$CaO—SiO_2$	51.72	.....	48.28	.....	1540
Calcium orthosilicate	$2CaO—SiO_2$	34.88	.....	65.12	.....	2130
Gehlenite	$2CaO—Al_2O_3—SiO_2$	21.91	37.18	40.91	.....	1590
Monticellite	$CaO—MgO—SiO_2$	38.30	.....	35.84	25.77	1498
Tricalcium disilicate	$3CaO—2SiO_2$	41.66	.....	58.34	.....	1475
Periclase	MgO	.....	.....	.....	100.00	2650
Madisonite	$2CaO—2MgO—Al_2O_3—3SiO_2$	37.94	21.46	23.61	16.98	1567
Calcium aluminate	$CaO—Al_2O_3$	.....	64.51	35.49	.....	1600
Cordierite	$2MgO—2Al_2O_3—5SiO_2$	51.35	34.86	.....	13.79	.....
Clino-enstatite	$MgO—SiO_2$	59.83	.....	.....	40.17	1557
Diopside	$CaO—MgO—2SiO_2$	55.48	.....	25.90	18.62	1391
Forsterite	$2MgO—SiO_2$	42.69	.....	.....	57.31	1890
Pentacalcium trialuminate	$5CaO—3Al_2O_3$	.....	52.17	47.83	.....	1455
Tricalcium aluminate	$3CaO—Al_2O_3$	.....	37.73	62.27	.....	1535
Tricalcium pentaluminate	$3CaO—5Al_2O_3$	.....	75.18	24.82	.....	1720
Sillimanite	$Al_2O_3—SiO_2$	37.08	62.92	.....	.....	1816
Spinel	$MgO—Al_2O_3$	.....	71.65	.....	28.35	2135
Cristobalite	SiO_2	100.00	.....	.....	.....	1625-1710
Corundum	Al_2O_3	.....	100.00	.....	.....	2050
Lime	CaO	.....	.....	100.00	.....	2570
Periclase	MgO	.....	.....	.....	100.00	2500-2800

alumina, and silica as determined by chemical analysis."

(Part of the quotation is italicized to emphasize the fact that after 34 years since its publication it is reasonable to say importance of slag mineral composition has not yet been generally recognized or accepted at its full value.)

2. "A blast furnace slag is never a pure chemical compound and may be considered, when in the solid crystalline state, brought about by suitable cooling conditions, as a mixture of three of the five well-known chemical compounds: Calcium metasilicate, anorthite, gehlenite, akermanite, and calcium orthosilicate. (Only the major components lime, alumina, and silica are considered.) There are only three combinations of these compounds encountered within the usual range of slag compositions:

a. Calcium metasilicate, anorthite, gehlenite.
b. Calcium metasilicate, gehlenite, akermanite.
c. Calcium orthosilicate, gehlenite, akermanite."

3. "The temperature-viscosity relationships of a slag containing up to 7 or 8 per cent MgO are determined by the relative amount of lime, alumina, and silica in the slag. Magnesia (MgO), as such, does not affect the slag viscosity so far as practical purposes are concerned unless present in amounts greater than 8 per cent. If the blast furnace operator considers in his slag calculations that MgO is the equivalent of CaO and attempts to keep the sum of these two oxides constant, then the viscosity of the resulting slag will vary with different MgO content, owing to the resulting change in the amount of CaO present. This statement also holds true as regards the minor constituents, such as CaS and MnO."

Authorities Differ—The foregoing quotations are given because of the later finding of McCaffery[14]. He published an advance paper to his studies of slag physical properties. Although the earlier Bureau of Mines investigators had considered silica, alumina, and lime of major and magnesia of minor importance to slag physical properties, McCaffery stresses the importance of magnesia to the same properties. He built an equilateral tetrahedron to represent the 4-component system CaO, MgO, Al_2O_3 and SiO_2. In the advance paper he said:

"A great many interesting things were brought out by a study of a CaO, MgO, Al_2O_3, SiO_2 model. For example, the authorities say that in considering blast furnace slags, the chemical equivalent in CaO, of the MgO present may be added to the CaO present. This is totally and completely wrong, for any slag which contains MgO has as a part of its composition some of the magnesia minerals present, such as pyroxene, forsterite, akermanite, spinel or cordierite. The physical properties of these magnesia minerals are different from the nonmagnesia minerals in slag, say calcium bisilicate, anorthite, gehlenite, calcium monosilicate or calcium sesquisilicate and it is immediately recognized that the addition of the chemical equivalent of the MgO to the CaO is incorrect."

McCaffery found 21 mineral compounds which can exist in blast furnace slag (for American coke furnace slags only eight of the compounds will normally be encountered) and that, any slag is composed of four and only four components or mineral entities. He says regarding the 21 mineral compounds:

"Of the many types of solution, it happens that these 21 components form among themselves, solutions of only two types. One, and by far the commonest type in slags, is like the solution formed by metallic lead and tin, with a eutectic at some intermediate composition, and the other type is like the solution of gold and silver which forms an isomorphous series. In the silica, alumina, lime, magnesia system, there are only two isomorphus series, the diopside-clino-enstatite or pyroxene series, and the akermanite-gehlenite or melilite series. All of the others are of the eutectic forming type."

In AIME technical publication No. 19 (1927) McCaffery said:

"The previous discussions of the cooling phenomena of solutions emphasizes the fact that crystals of definite composition separate out from the liquid mass during the cooling process. However, while the solution is entirely liquid, there is little or no dissociation of the compounds and a liquid slag is not to be considered as a mixture of oxides but rather as of compounds of the oxides."

These quotations from McCaffery appear to be of great importance to practical furnace operation because of their probable affect upon thermal conditions within the furnace. This phase of the subject will be discussed later.

Two-Way Investigation — Field and McCaffery both were investigating slag physical properties, principally viscosity. Slag compositions studied by them were compositions as tapped from the fur-

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nace. At the time of their investigations no accurate information on slag formation within the furnace was available for study. In part their investigations were attempts to establish a relation between slag viscosity and its desulphurizing action or power. Both disclosed that slag viscosity varies with its temperature and that its mineral-composition determines the required temperature. These disclosures on slag temperature are important to practical furnace operation because they prove that the desulphurizing power of slag is determined as much, if not more, by temperature than it is by chemical composition, and that viscosity is greatly influenced by the temperature as well as by the chemical composition.

In 1926 Kinney[15] reported results of quantitative measurement of chemical and thermal reactions within the furnace. Regarding slag composition he says:

"The composition of slag recovered from the cinder notch is not similar to that found at the elevation of planes 4, 5, or at the tuyere level. Physical measurements, such as viscosity, density, and melting point, of samples taken at the flush are not representative of the slags found in the bosh of the furnace. Field and Royster have shown that slag composition varies from cast to cast and from one part of a cast to another. In a way this is representative of the variation of slag composition on the interior of the bosh of the furnace, only the differences are more marked. The viscosity, melting point, and density of the samples taken from the slag at the cinder notch are probably fairly representative of that which is formed at the tuyere level."

Opinion is offered that the irregularities in the slag composition observed by Kinney are characteristic of furnace operations using natural raw materials which are not uniform in slag constituent ratios. However, they are not characteristic of all furnace operation. In the Feb. 11, 1952 issue of STEEL, the writer presented a comparison of operating data calling particular attention to the advantage of uniform slag composition. The distinct advantage as reflected in the operating data shown stresses the importance of close attention to gangue content in any program of raw material beneficiation.

Big Lift in Coal Handling

Barge unloader completed for Jones & Laughlin's Aliquippa Works unloads about 1350 tons of coal per hour. Each continually-moving elevator bucket takes a ½-ton bite from the pile as barge moves slowly past the 83-foot-long hoist. Machine is part of handling facilities built for J & L by Heyl & Patterson Inc. of Pittsburgh

Recommends Further Study — The Bureau of Mines also points out in technical paper No. 397 that it would be desirable to study the physical properties of slags, which are representative of those found in the bosh and near the tuyeres of the furnace, rather than the properties of those which have passed through the furnace and have found their way to the slag dump.

A combination of Kinney's quantitative measurements of thermal and chemical reactions within the furnace and McCaffery's disclosures on slag mineral composition provides a means for the furnace operator to visualize thermal conditions within the furnace more satisfactorily than is possible in any other way. The furnace operator is concerned principally with thermal requirements for slag in its different stages of formation, because the temperature required for the purpose also determines the volume and velocity of gas which leaves the bosh and must pass through the shaft. With slag mineral composition favorable to other thermal effects and requirements within the furnace, the slag viscosity will be satisfactory.

Kinney's report in technical paper No. 397 (1926) was amplified in 1927[16]. It may be well said that in importance to thermal effects within the furnace the findings reported in papers Nos. 391 and 397 rank with the earlier discovery that slag is not a solution of oxides but of minerals formed from the oxides. Bureau of Mines investigators and McCaffery both emphasize that slag physical properties are determined by the mineral properties and not by the oxide properties from which the minerals are formed.

Table XVII lists the 21 minerals which McCaffery found in slag, and the oxides from which they are formed. Melting temperatures are taken from Rankin and Wright[11] for the SiO_2-Al_2O_3-CaO minerals, and from Anderson[17] for the minerals containing MgO. The first eight minerals listed are those commonly encountered in American coke furnace slags and their several possible combinations fall within the akermanite-gehlenite or melilite series cited by McCaffery.

Some Compounds Unstable—The great difference in melting temperatures of the respective oxides SiO_2-Al_2O_3-CaO-$\overline{MgO}$ and the melting temperatures of the minerals formed from the oxides, are of major interest to the practical furnace operator. Rankin, Wright and Anderson, disclose that some of these mineral compounds are not stable in composition but will form eutectics with other minerals. Melting temperatures of the new compounds formed will be lower than the respective temperatures of the minerals which formed the new compound. To the practical blast furnace operator the item of particular interest in this disclosure appears to be that the difference between the melting temperatures of the new compounds formed by the eutectics and the melting temperatures of the minerals from which the new compound was formed, is never as great as the difference between the melting temperatures of the original minerals and the oxides from which they were formed. The practical value of this disclosure appears to be that the furnace operator can

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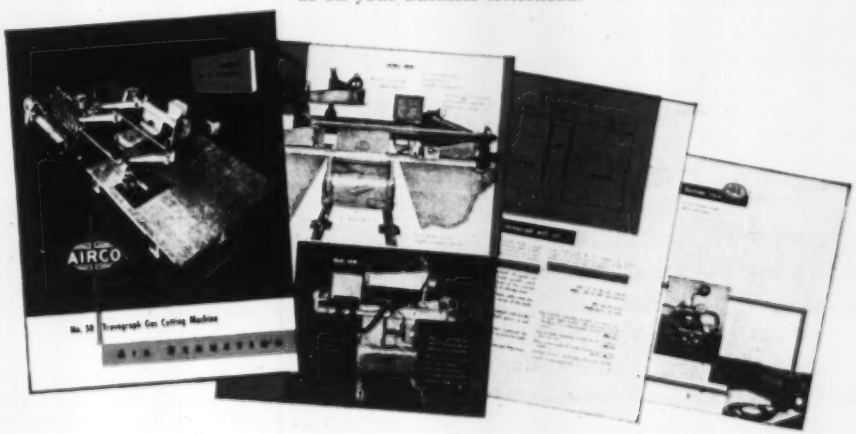

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use McCaffery's chemical composition diagrams to classify slag by tetrahedron, from which mineral composition can be determined by calculation. When the existing percentage of the respective minerals is known a mathematical average of the known mineral melting temperatures will indicate with reasonable accuracy the thermal conditions caused by the slag composition—in the tapping stage and in stages of formation preceding the tapping stage.

Research conducted by the authorities cited was based upon the four principal slag constituents, SiO_2-Al_2O_3-CaO-MgO. In actual furnace slag there are always minor percentages of alkalies, sulphur and unreduced oxides of iron and manganese, having a sum total of about 3.00 per cent. Unquestionably these minor constituents have an influence upon the slag temperature the extent being in proportion to the existing percentages, which are always small.

Lacks Accuracy—Since the calculated slag mineral composition and temperatures are based upon 100 per cent of the four principal constituents the existing percentages and temperatures calculated will not be 100 per cent correct. The practical furnace operator, however, is not as much concerned with absolute accuracy in the temperature measurement as he is in the indication of thermal trends and conditions within the furnace. McCaffery says there is little or no dissociation of compounds while slag is in the liquid state. This finding affords a possible explanation of the fact that the temperature of slag cast from the furnace and calculated with the procedure previously described, can be checked remarkably close with the use of an optical pyrometer and, therefore, justifies the use of the procedure.

The only concern the practical furnaceman has with slag tapped from furnace is the deductions he may draw from its composition regarding thermal conditions which exist within the furnace. Since this composition is determined by the chemical composition of the burden materials a review of the development of American furnace practice may be enlightening. From

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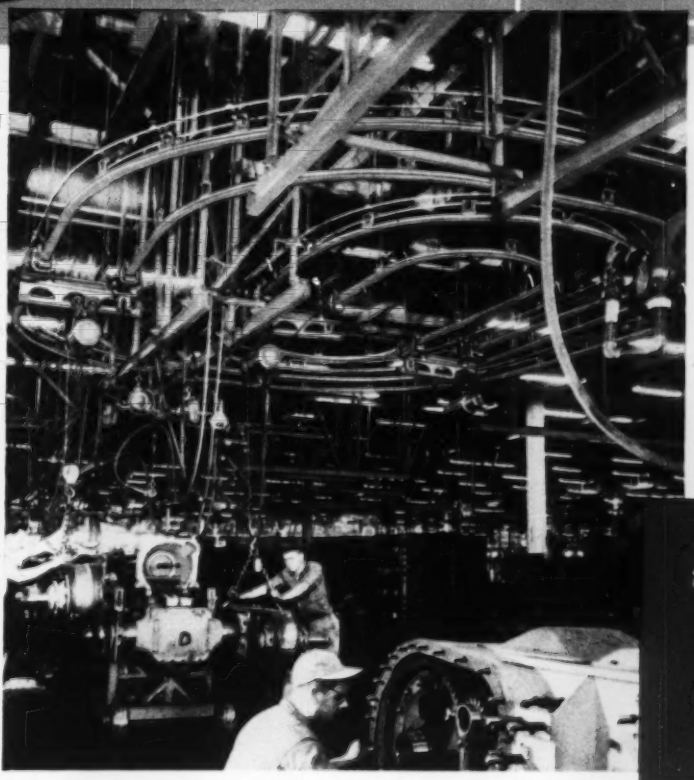

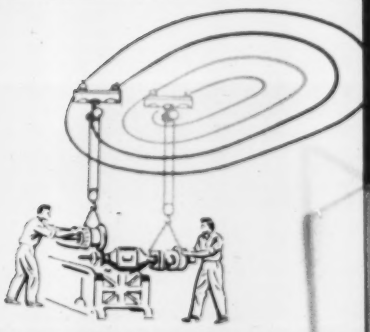

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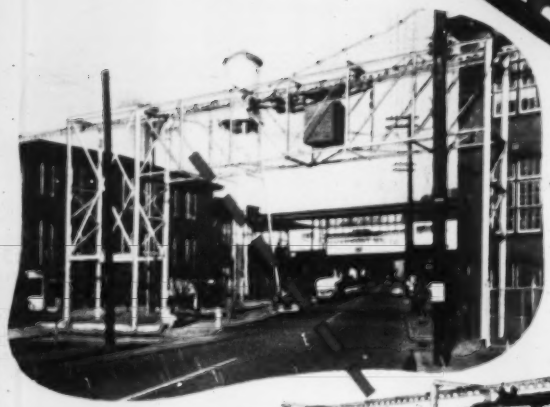

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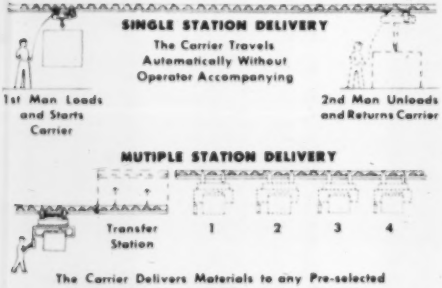

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it, conception of the raw material problem, which confronts the industry today, can be more comprehensive than a conception based upon current conditions only. The past use of natural lake ores lessened the need for an intimate understanding of blast furnace chemistry but the present use of them and the need for ore beneficiation, intensifies the need for that understanding.

(To be continued)

[33] "Ternary System, CaO, Al_2O_3, SiO_2" by G. A. Rankin and F. E. Wright, American Journal of Science, vol. 39, 1915.

[34] "A Method for Measuring the Viscosity of Blast Furnace Slag at High Temperatures" by A. L. Field, U. S. Bureau of Mines Technical Paper, No. 157, 1916.

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[36] "The Constitution of Blast Furnace Slags" by R. S. McCaffery, A.I.S.I., 1924.

[37] "Composition of Materials from Various Elevations in an Iron Blast Furnace" by S. P. Kinney, U. S. Bureau of Mines Technical Paper No. 397, 1926.

[38] "Iron Blast Furnace Reactions" by S. P. Kinney, P. H. Royster and T. L. Joseph, U. S. Bureau of Mines Technical Paper No. 391, 1927.

[39] "The System Anorthite, Forsterite, Silica" by O. Anderson, American Journal of Science, vol. 39, 1915.

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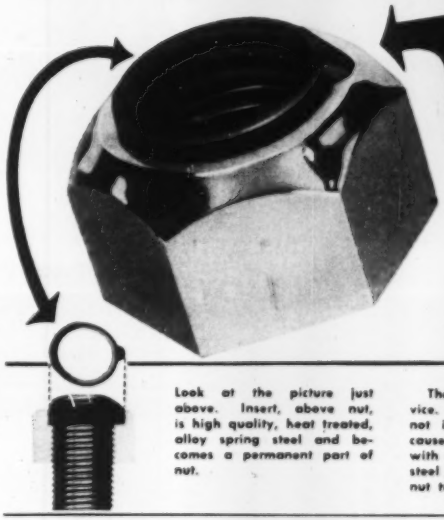

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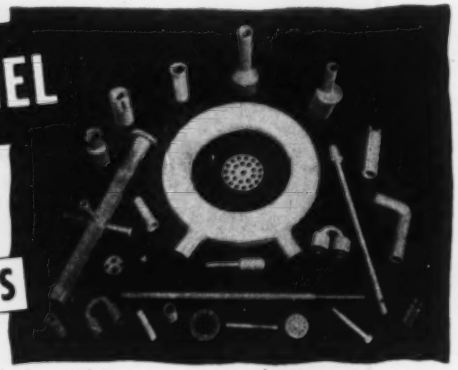

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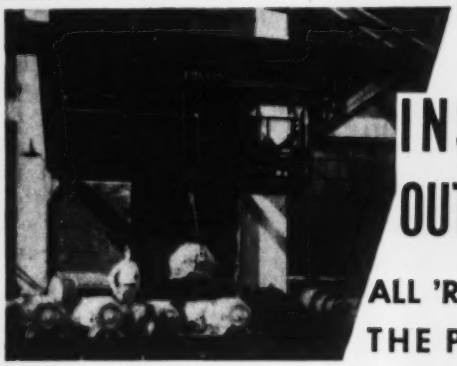

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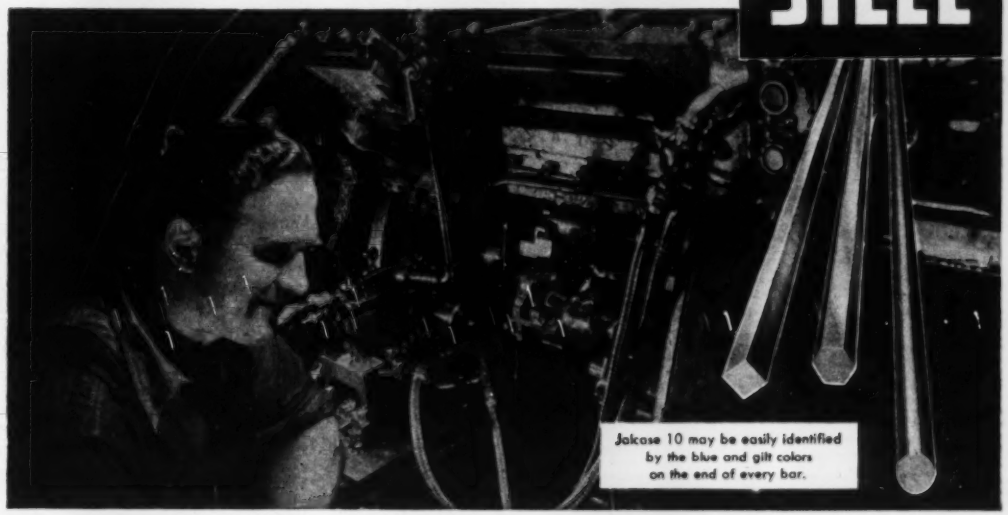
. . . machine better cold-finished parts

J&L STEEL



Check these advantages of **JALCASE 10** *that offer you faster, more economical operations . . .*

NO HEAT-TREATING OF FINISHED PARTS REQUIRED

Many times finished part specifications on a job call for a high degree of hardness, but not as high as that obtained through heat-treating the finished part. In these applications, parts manufacturers and machinists have found it profitable to use Jalcase 10 and eliminate heat-treating altogether.

MINIMUM DISTORTION

Although Jalcase 10 is a high-carbon steel, distortion is cut to a minimum through special treatment during the cold-finishing process. As a result, when mechanical properties must be as high as possible and distortion held to a minimum, Jalcase 10 fulfills these rigid requirements.

AMERICA NEEDS SCRAP TO MAKE MORE STEEL

HIGH MECHANICAL PROPERTIES

Jalcase 10 (A.I.S.I. No. C-1144) has the following cold-finished properties:

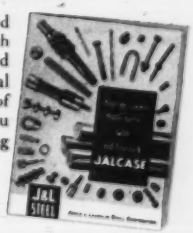
Minimum Tensile Strength	115,000 lb/sq. in.
Minimum Yield Strength	100,000 lb/sq. in.
Elongation in 2 inches	7% (minimum)
Reduction of area	20 %(minimum)
Brinell Hardness Range	235—285

PLUS . . . all the other advantages Jalcase steels have over ordinary screw stock:

1. lower cost per unit produced
2. finer finish on completed pieces
3. longer machine-tool life
4. less screw-machine down-time

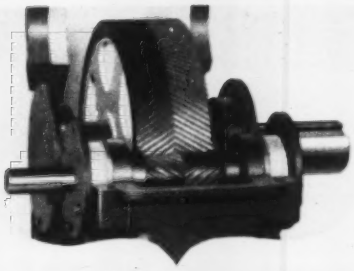
WANT MORE INFORMATION?

Send for our FREE booklet entitled "You Can Make Them Better with Cold-finished Jalcase." This illustrated booklet gives you complete technical information about *all ten* grades of Jalcase and how they can help you get better results in your machining operations. WRITE TODAY!

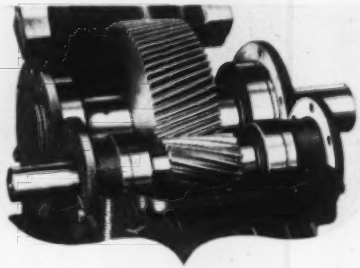


JONES & LAUGHLIN STEEL CORPORATION

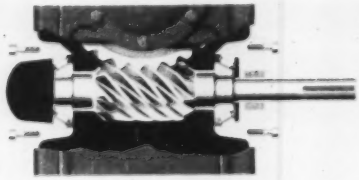
404 JONES & LAUGHLIN BUILDING, PITTSBURGH, PENNSYLVANIA



A Complete Line of Speed Reducers



HERRINGBONE · HELICAL · WORM GEAR



for Unbiased Selection of Type

• Horsburgh & Scott Speed Reducers are available in 5 general groups, 12 distinct types in many sizes and hundreds of standard ratios. Many considerations, such as speed of driving and driven shafts, shape of housing and characteristics of drive, point definitely to one specific unit as the best drive for a particular duty. Having such a complete line to select from, engineers have exceptional freedom for unbiased selection of the right reducer for the job.

THE HORSBURGH & SCOTT CO.
GEARS AND SPEED REDUCERS
3112 HAMILTON AVE. • CLEVELAND 14, OHIO, U.S.A.

Send note on Company Letterhead for Speed Reducer Catalog 46

the frame using a 4-pound hammer. No failure occurred in the weld.

Microwave Wiring Simplified

Relatively inexpensive method for producing microwave wiring is announced by the Federal Telecommunication Laboratories Inc., Nutley, N. J., research associate of the International Telephone & Telegraph Corp. The method is based on the use of a ground plane system that acts as a radio mirror for a conductor supported above it, creating, in effect, a parallel wire system in which symmetry is obtained without elaborate machining.

Wiring can be produced directly from diagrams by etching the circuits on a dielectrically coated base plate or by the employment of stamping and embossing techniques. The resulting equipment is much lighter and more compact than existing types of microwave plumbing.

Frames Brazed at High Speed

Heavy gage tubing and a bracket, frame components of small toy tractors, are brazed simultaneously in 45 seconds by high temperature radiant gas equipment manufactured by Selas Corp. of America, Philadelphia.

F. C. Castelli Co., Philadelphia, brazes these frames at the rate of 116 an hour. Tests of the brazed frames show the brazed joints are at least as strong as any other part of the frame. Controlled heating equipment burns a mixture of gas and air within ceramic gas burners that deliver uniformly high temperature for a smooth distribution of the braking alloy.

Foreign Participation Told

First indication of the worldwide scope of the Centennial of Engineering to be celebrated in Chicago this summer is announced by its president, Lenox R. Lohr. Leading scientific societies of seven foreign nations have pledged active participation. These are in addition to the 49 American scientific and engineering bodies already announced.

European engineering societies as well as those of Latin and Central America will have leading

Need a Cooling Recipe For Hot Metals?

Let's say you're machining a tricky part, heat treating a "lean alloy" steel, or operating equipment that must run at top speeds . . . all operations that call for *removing heat fast.*

More often than not, these are problems which are solved most effectively with the help of "job-tailored recipes" such as Houghton has been developing over the years.

By getting into the shops—as Houghton men are invited to do—they are able to work side by side with metalworking men who have all sorts of problems like these. As a result, we've come up with new and better ways to keep tools and bearings from overheating and cool hot metals faster with safety.

Many a metalworking plant like yours is finding it possible to relieve production bottlenecks—to bring costs into line—by taking advantage of Houghton's 85 years of experience with the metalworking industry. Our research files are always available when you ask the Houghton Man for help. Why not put our metalworking "know-how" to work for you?

E. F. HOUGHTON & CO.
PHILADELPHIA · CHICAGO · DETROIT · SAN FRANCISCO

Ready to give you on-the-job service . . .

Metalworking and Textile Processing Products · Lubricants · Packings · Leather Belting

Cutting Oil—8c a Gallon! Yes, Houghton research has made it possible to produce the most effective cutting fluid you ever used by mixing one part of Antisep All-Purpose Base with up to 30 parts water. This heavy-duty cutting fluid is chalking up new records for low-cost machining. Versatile, too—it can be used for better than 90% of your general machine work and for automatics.

Bothered with Alloy Deficiency? Heat treaters facing the growing problem of quenching "lean alloy" steels are welcoming Houghto-Quench—Houghton's answer to the critical quenching problem. Ask the Houghton Man to show you how it gives you fast, sure quenching of today's steels low in nickel, chrome and other alloys.

Want to Eliminate "Guess-Work" in hot spot lubrication? Check the Houghton Hi-Temp series for a lubricant designed to give you assured efficiency at every temperature in the critical range.

Taking the Heat off Bearings in high speed operations is the job for Houghton "Sta-Put" lubricants. They "stay put"—carry heavy loads with ease—don't break down under toughest conditions!

Houghton Pioneering in metalworking and processing fields has resulted in a vast amount of helpful production data. Whatever your problems, ask the Houghton Man or write to E. F. Houghton & Co., Philadelphia 33, Pa.

"I need *less* steel now... I'm using ROCKRITE TUBING!"

This businessman knows how to conserve scarce steel. For volume production of ring-shaped or cylindrical parts, he's specifying close-tolerance Rockrite Tubing . . . the pre-sized tubing that requires *less* machining. That means *more* of the metal goes into the finished part. Here's an actual case:

3,000 Lb ORDINARY TUBING = **2,000 Lb of Parts + 1,000 Lb of Chips**

2,360 Lb ROCKRITE TUBING = **2,000 Lb of Parts + 360 Lb of Chips**

Why buy more tubing than you need and then throw it away in the form of costly chips? Bulletin R2 gives facts and figures on how Rockrite Tubing can save you metal and money. Write for your copy today.

More Rockrite Steel Saving!

By using long lengths of Rockrite Tubing, you can substantially reduce scrap end losses. Another plus! Cold-working certain steels by the Rockrite process gives them higher mechanical properties. Result? Hydraulic cylinders and other pressure parts require less wall thickness. Steel conservation is as high as 50%.

ROCKRITE saves more than any other tubing

- Higher cutting speeds
- Tools last longer between grinds
- Work-surface finishes are better
- Machined parts have closer tolerances
- Stations on automatics are often released for additional operations
- Extra-long pieces available—less downtime for magazine stocking and fewer scrap ends
- Closer tolerances often eliminate necessity for machining on outside or inside

ROCKRITE® TUBING

TUBE REDUCING CORPORATION • WALLINGTON, NEW JERSEY

parts in the ceremonies planned for the International Day program scheduled to open the convocation meeting on Sept. 3.

Gages Ceramic Coating

Thickness of ceramic coatings can be measured within 0.0005-inch accuracy by an instrument built at the development laboratory, Ryan Aeronautical Co., San Diego, Calif. Designed by the National Bureau of Standards, the device provides a nondestructive method for determining the gage of protective coatings applied to nonmagnetic materials. Technique employed can be used with curved surfaces as well as flat areas.

CERAMIC COAT ACCURACY
. . . unscarred surface remains

Instrument consists of two parts: A plastic test head in which an electromagnetic probe coil is embedded and an inductance balance indicator using a galvanometer. Protruding through the coil is a slender plastic rod attached to a dial indicator gage. This rod is free to move axially and its displacement is indicated by the gage. The inductance balance unit incorporates an impedance bridge which can be adjusted by potentiometers to bring the galvanometer to zero reading when electrical balance is attained.

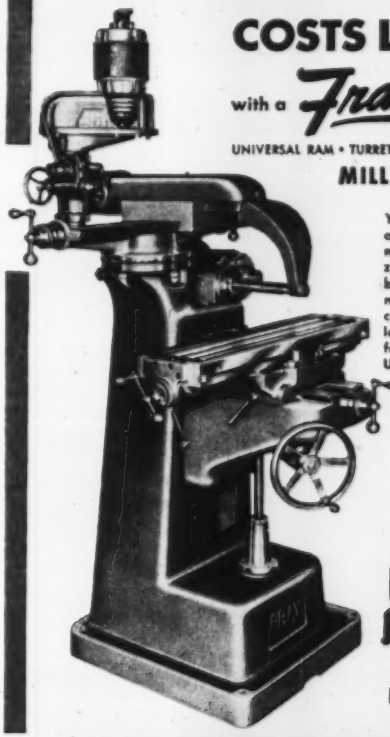
Principle involved is the change in inductance of a coil when it is brought close to a metal surface. The metal acts as a short circuiting device which critically affects the coil's inductance over very short distances. Presence of the ceramic material has no appreciable effect on the field at the frequency used.

Uncoated sample of the metal is used to calibrate the instrument. The probe coil is placed against the metal surface with the plastic feeler rod in contact. Dial indicator is set to read zero. The current is turned on and inductance of the coil is established as a reference by adjusting the bridge until the galvanometer also reads zero.

Coil is then transferred to the surface of the ceramic coated part. Its distance is adjusted until galvanometer reads zero. This will occur when the coil is the same distance from the conductive metal as it was when the calibration was made. At this point the plastic feeler rod will be displaced in exact amount equal to the thickness of the ceramic coating. This distance can be read directly from the dial indicator gage in divisions of 0.0001-inch.

The process lends itself to the measurement of any nonconducting coating such as ceramic, paint, plastic or paper. The only restric-

WORK MOVES FASTER...
COSTS LESS...
with a Fray NO. 10RH
UNIVERSAL RAM • TURRET TYPE • VERTICAL & HORIZONTAL
MILLING MACHINE



You get a wider work range than with any other machine this size. You can machine at any angle—vertical, horizontal or both. You can mill, drill or bore at any angle. Hence resetting isn't necessary. Just change the machine—changing is quick for vertical and regular horizontal milling. Jobs are done faster and better... at less cost. • It's Universal • Rugged • Easy to Operate.

A high precision tool.
Write for details and specifications.
Bulletin 10.

FRAY "ALL-ANGLE" HEAD
TYPE 4

For deep, heavy cuts. Permits working to extra close limits. Any angle up to compound 2-way. Request Bulletin 4.

All-Angle
FRAY MACHINE TOOL CO.
515 WEST WINDSOR ROAD, GLENDALE 4, CALIFORNIA

tion on the base metal composition is that it have a magnetic permeability of not much more than unity. For good accuracies the thickness of the base materials should be greater than the depth of penetration of the magnetic field. This is approximately a minimum thickness of 0.025-inch for highly conductive materials and 0.050-inch for metals with high resistivity.

Furnace Restores Carbon

Controlled atmosphere furnace at the Hazelwood cold finishing department of Jones & Laughlin Steel Corp., Pittsburgh, is supplying customers with carbon-restored bars making possible the attainment of heat-treated hardness at the surface without the necessity of removing a decarburized skin. The car-bottom type furnace has been in operation since December 1, 1951. It was installed by Surface Combustion Corp., Toledo, O.

This furnace eliminates the necessity of additional metal removal since sufficient carbon is restored to the surface to insure that the desired surface hardness will be obtained in heat treating.

Bars are placed on the car bottom and the car rolls into position. The furnace cover is dropped onto the car and the gas, a mixture of nitrogen, carbon monoxide and hydrogen is fired in. This inhibits any reaction on the surface of the bars while the furnace is brought up to working temperature. When the working temperature is reached a second gas, richer in carbon monoxide, provides the necessary high carbon potential for carbon restoration.

The carbon from the carbon monoxide penetrates the skin of the bars and migrates inward. This migration under heat is the process that produces bars free of decarburization.

Air Loading, Feeding Discussed

Booklet "Air Power at Work" is announced by Mead Specialties Co., Chicago. It contains case histories of 39 different production problems and their solutions with semiautomatic or automatic combinations of various Mead air-operated devices. Photographs show the equipment involved. Copies of

● Did you know you can get a READING CRANE that's CUSTOM-BUILT *at no extra cost* to solve your specific materials handling problem?

When you order a READING CRANE, our engineers offer you a choice of several interchangeable motor, trolley and hoisting units. The crane is then "tailor made" to your own job requirements.

Known as UNIT CRANE DESIGN, this unique method of crane construction gives you far greater operating efficiency. Then too, your maintenance costs are reduced because any one unit can be removed for overhauling or repair without dismantling any other unit.

See your nearest distributor for more information on how READING UNIT CRANE DESIGN can give you better materials handling at less cost. And for your free copy of "The Why and How of Faster Production", drop us a line, today.

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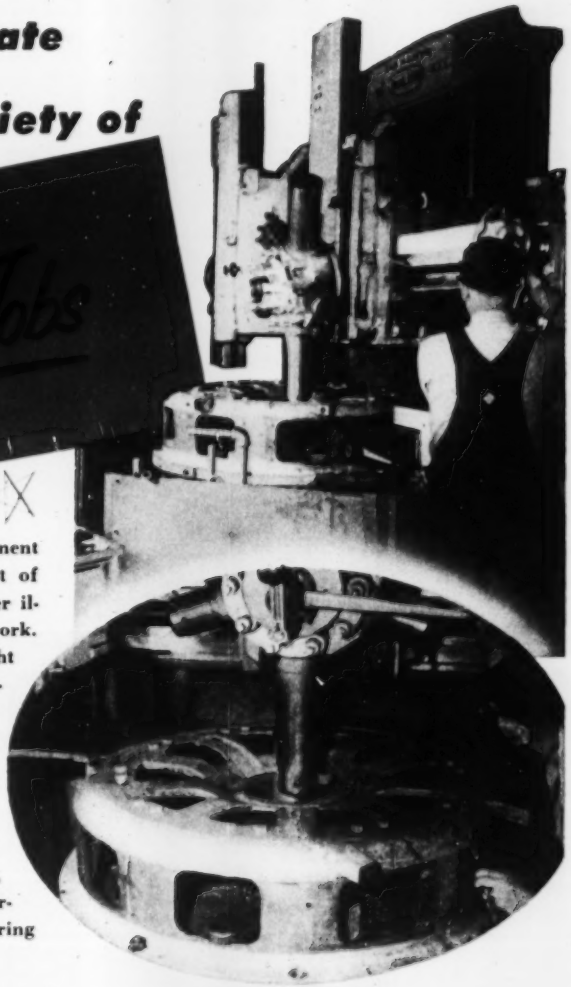
OVERHEAD TRAVELING CRANES

READING CRANES

A fast accurate producer on a variety of Diesel Jobs



Here is a case in point. A prominent midwestern road with a high complement of Diesels keeps the 54-in. Bullard Cut Master illustrated busy with a variety of Diesel work. Shown is a typical job — boring a freight Diesel generator bell housing for a bushing. Other operations on this particular job include boring the bushing, pressing the bushing in the housing and finally boring the bushing to fit a roller bearing.

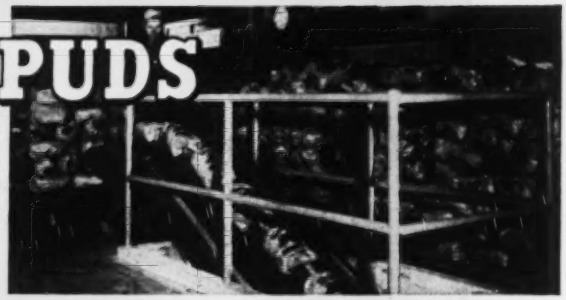
This versatile, fast-moving Cut Master with its wide range of speeds and feeds, is also utilized in this modern shop for boring gears for Diesel power wheels and for boring Diesel wheels.

BULLARD

Wherever the Cut Master is used it gives shop schedules a big lift — keeping costs down and providing economical, top-level performance for the big production job or the less-frequent but equally important miscellaneous runs.

THE BULLARD COMPANY

[redacted]
CONNECTICUT



Whatever you make or handle, Standard Conveyors speed operations . . . save time and costs . . .

Cartons of soap — bags of potatoes — coils of sheet steel, weighing several tons — Standard Conveyors are built to handle them all — smoothly — at lowest cost.

Whatever you make or handle in your business Standard Conveyor, with an experience record of more than 45 years, has the "know-how" to assist you to use conveying equipment to best advantage. Write —

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VERTICAL LIFTS • PNEUMATIC TUBE SYSTEMS

the book will be sent on request to the company, Dept. NB-49, 4114 N. Knox Ave., Chicago 41.

Corrosion Information Given

The 1951 ASTM Edgar Marburg Lecture, "Corrosion Testing," by Francis L. LaQue, development and research division, International Nickel Co. Inc., New York, has been published.

Lecture comprises a survey of corrosion testing programs and methods of corrosion testing. Mr. LaQue discusses the distinction that must be made between the corrodibility of a material and the protective value of its corrosion products and how these are influenced by both composition of the material and incidental conditions of its exposure.

Topics touched on in the book inelude: Atmospheric corrosion studies; relations between rust color and corrosion; comparison of atmospheres; and galvanic corrosion. Also discussed are a variety of tests. Copies of the booklet can be procured from the American Society for Testing Materials, 1916 Race St., Philadelphia 3, at $1.50 each.

Unit Duplicates Contours

Single motion duplicator made by the Raytheon Mfg. Co., Waltham, Mass., consists of a follower, electronic control unit and output drive motor. Follower electrical output varies with the contours of a template. Signal is detected and amplified in the control unit which drives the output motor. Motor then positions the follower and cutting tool.

Duplicator produces complicated cams on milling machines and automatically contours single-point lathe work. Voss Engineering Co., Pittsburgh, is distributor for the equipment and handles application engineering.

Duplexing Advantages Told

Suggestions on how to improve existing duplexing systems and how to establish efficient duplexing arrangements are offered in a paper from Whiting Corp., Harvey, Ill.

Duplexing is the use of two furnaces operated together to provide a continuous supply of metal for

Millions

THE FERRY CAP & SET SCREW CO.

2159 SCRANTON ROAD • • • CLEVELAND 13, OHIO

"SHINYHEADS"

America's Best Looking Cap Screw

Made of high carbon steel — AISI C-1038 — to standards for Full Finished hexagon head cap screws — bright finish. Heads machined top and bottom. Hexagon faces clean cut, smooth and true, mirror finish. Tensile strength 95,000-110,000 p.s.i. Carried in stock.

"HI-CARBS"

Heat Treated Black Satin Finish

Made of high carbon steel — AISI C-1038. Furnished with black satin finish due to double heat treatment. Hexagon heads die made, not machined. Points machine turned; flat and chamfered. Tensile strength 130,000-160,000 p.s.i. Carried in stock.

"LO-CARBS"

Made of AISI C-1018 steel — bright finish. For use where heat treatment is not required and where ordinary hexagon heads are satisfactory. Hexagon heads die made to size — not machined. Points machine turned. Tensile strength 75,000-95,000 p.s.i. Carried in stock.

SET SCREWS

Square head and headless — cup point. Case hardened. Expertly made by the pioneers in producing Cup Point Set Screws by the cold upset process. Cup points machine turned. Carried in stock.

FILLISTER CAP SCREWS

Heads completely machined top and bottom. Milled slots — less burrs. Flat and chamfered machined point. Carried in stock.

FLAT HEAD CAP SCREWS

Heads completely machined top and bottom. Milled slots — less burrs. Flat and chamfered machined point. Carried in stock.

"SHINYLAND" STUDS

All studs made steam-tight on tap end unless otherwise specified, with flat and chamfered machined point. Nut end, oval point. Land between threads shiny, bright, mirror finish. Carried in stock.

ADJUSTING SCREWS

Valve tappet adjusting screws — Hexagon head style — to blue print specifications — hexagon head hard; polished if specified — threads soft to close tolerance — points machine turned; flat and chamfered.

CONNECTING ROD BOLTS

Made of alloy steel — heat treated — threads rolled or cut — finished to extremely close thread and body tolerances — body ground where specified. Expertly made by the pioneers in producing connecting rod bolts by the cold upset process.

SPRING BOLTS

Case hardened to proper depth and ground to close tolerances. Thread end annealed. Supplied in various head shapes, with oil holes and grooves of different kinds, and flats accurately milled.

FERRY PATENTED ACORN NUTS

For ornamental purposes. Steel insert — steel covered. Finish: plain, zinc plated, cadmium plated. Size: 9/16", 3/4", 15/16" across the flats.

Tapped 1/4" to 3/4" inclusive. Cross section of Ferry patented acorn nut, showing how steel hexagon nut fits snugly into shell.

Pioneers and Recognized Specialists, Cold Upset Screw Products since 1907

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WRITE FOR INFORMATION

SEND FOR SAMPLES

castings. Whiting will send copies of "Facts on Duplexing" to those requesting it.

Cars Form Furnace Floor

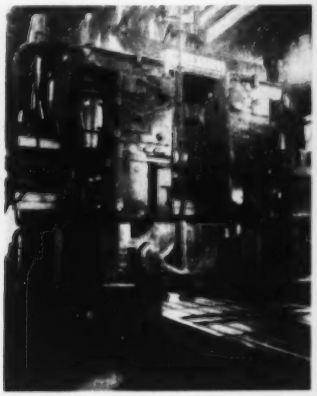
Electric driven furnace cars built by Easton Car & Construction Co. will be used at the General Steel Castings Corp. heat treating plant under construction at Eddystone, Pa. The 24 cars will serve a battery of furnaces in a completely automatic system developed for continuous heat treating of cast armor steel tank components for the U. S. Army.

Cars carrying the castings are delivered to the furnaces from a transfer car. Sequence of the movement of the cars to the several furnaces and timing of their passage through the zones of the furnaces are automatically governed from centralized control stations.

Each car is driven by two electric motors with chain drives to each axle. Power is supplied by a third rail. Measuring 26 feet 9 inches long by 11 feet 8 inches wide, each of the cars has a capacity of 75,000 pounds. When assembled at Eddystone the cars will be equipped with an 8-inch refractory deck and side and end sand seals. The cars in train will form the floor of the furnace.

Planer-Mill Installed

Ingersoll planer-type milling machine is in operation at Allis-Chalmers' West Allis Works. Pieces up to 108 inches high, 108 inches wide and 30 feet long can be handled by the machine. It has two railheads mounted on an adjustable rail and two fixed sideheads, one right and one left hand. Heads are individually motor driven and may be used in any combination.



DOES WORK OF SIX MACHINES
. . . large parts capacity boosted

This is driven by a 40-hp, constant-speed rapid-traverse motor, or a 10-hp, 60-to-1 range infinitely variable, electronically controlled feed motor. Rail is elevated or lowered by another set of virtually identical motors.

Attachments enable the machine to do a wide variety of work. Among them are speed-up drives for small cutters, and right angle attachments for milling the ends of long work, recessing, etc. Both high-speed steel and carbide tipped cutters up to 14 inches in diameter are used. Because of size and weight of the cutters, they are pulled into the spindles electrically and automatically locked in place.

Machine is controlled mainly from a suspended pushbutton sta-

FASTER — LOWER COST FORMING in WIRE AND RIBBON-METAL
NOT THIS!
ON REGULAR PROGRESSIVE DIE PRESSES
..but
THIS!
148,000
★NILSON
4-Slide
Cat. No. 8-1-F
THESE FIGURES TELL THE STORY:
METHOD
NUMBER OF MACHINES
HORSE-POWER
DAILY OUTPUT
Standard progressive die set up
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2
148,000
Here's an actual instance where a manufacturer of electric switches tripled production on yoke springs —and cut costs way down!
NILSON
4-Slide
FORMING MACHINE
TRIPLES PRODUCTION
LOWERS COST
17 DIFFERENT MODELS!
Nilson Four-slides are built in many models to provide the most efficient production of formed parts of varying sizes made from coiled ribbon stock up to 2½", or coiled wire up to ½" in standard models.
OTHER NILSON PRODUCTS
• Automatic chain-making machines.
• Automatic staple forming machines.
• Wire and Stock reels.
• Wire straightening equipment.
The chart shown above clearly demonstrates the big savings in overhead, maintenance, labor and time.
Figure it out! Taking the stock directly from the coil, Nilson combination press and 4-slide forming machines feed, straighten, pierce, blank, swage, stamp, coin, perform up to five forming operations and cut-off . . . all in one quick and precise operation! See how Nilson can save you money — boost production and profits on your wire or ribbon-metal forming operations. Get the facts today. Ask for bulletin.
For specific recommendations . . . send details of your operation.
Specialists in Wire Forming Equipment for Over 30 Years.
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THE A. H. NILSON MACHINE CO.
1503D RAILROAD AVENUE • BRIDGEPORT 5 • CONNECTICUT
Agents in Principal Cities: CHICAGO • CLEVELAND • DETROIT • LOS ANGELES • TORONTO, CANADA

steady, high production from BIRDSBORO ROLLS

PEAK PRODUCTION to meet today's crowded steel rolling schedules starts in the foundry where the rolls are engineered. It is there that dependable roll performance on the job is assured through proper roll design, painstaking analysis control, plus pioneering leadership in the development of ever finer rolls. That's one of the reasons why users of Birdsboro rolls are turning out alloy, stainless and high speed steels in greater volume at lowest cost per ton.

One example of Birdsboro's constant roll research is found in Curoloy copper grain rolls. With their special analyses developed and patented by Birdsboro, they provide you with a unique combination of physicals to keep production up on a wide variety of jobs. In use in many mills, Curoloy is further proof of how you can depend on Birdsboro for help in the solution of your roll problems. Next time, discuss your individual problems with a Birdsboro engineer.

CUROLOY

R-7-52

BIRDSBORO
STEEL FOUNDRY & MACHINE CO.
Birdsboro, Penna.

Offices in
BIRDSBORO, PA.
AND PITTSBURGH, PA.

ROLLS

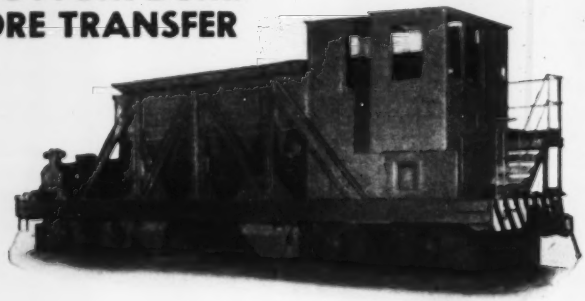
Designers and Builders of:
Rolls • Crushing Machinery • Steel Mill Machinery
Hydraulic Presses • Special Machinery • Steel Castings

DEPENDABILITY TO SATISFY RECORD DEMANDS

ATLAS CARS

Atlas Cars for steel plants are known to have that extra work factor which is so important in these days of high production.

50-TON BOTTOM DUMP ORE TRANSFER



This 50-ton ore transfer is a modern air-operated car with a heavy slab truck to protect motors and brakes when plowing through ore piles. For added safety a folding car pusher arm is used and is provided with a safety latch which cannot be lowered unless the switchman holds the latch. The overhung cab allows a clear line of vision for the operator.

Special features include electric hopper heaters, centralized lubricating, roller journal bearings, air brakes and, of course, all necessary safety features.

Custom Builder of Steel Plant Cars

THE ATLAS CAR & MFG. CO.

ENGINEERS MANUFACTURERS

1140 IVANHOE RD. CLEVELAND 10, OHIO, U. S. A.

tion with secondary operations and indication instruments concentrated in a bank of floor-mounted control cabinets. Two screw-type chip conveyors about 35 feet long continuously carry the chips to large bins located in pits several feet below floor level. These bins are lifted out by means of existing crane facilities.

Cards Serve Production Control

Growing demands for tighter and faster methods of production control regardless of the size of the manufacturer caused Remington Rand Inc. to increase the size and scope of their business services department.

Punched card accounting equipment gives facts and figures for sound materials purchasing, inventory control, cost accounting and machine and man scheduling without any cash outlay for equipment or additional personnel on the part of the customer.

Department takes original records as source material and translates the pertinent information into punched cards. The automatic cards then give the answers to the questions. Copies of folder BSD-6 describing the service will be sent on request to the company, 315 Fourth Ave., New York 10.

Brochure on Powder Metallurgy

Brochure on porous self-lubricating bearings and powder metallurgy is available from the Detroit Sintered Metals Corp. On the first page are pictures of parts that may be made with this process. Inside pages explain compositions and the corresponding SAE and ASTM as well as military specifications. Approved preferred sizes are shown. Requests should be sent to the company, 75 E. Wacker Dr., Chicago 1.

Communications Line Expanded

Cross-country communications system will handle either 24 voice circuits, more than 400 teletype operations, nearly 1000 remote telegraph circuits or any combination of these facilities. Microwave equipment, by Motorola Inc., Chicago, is available in two basic designs: Remote type installation for use where the customer has housing facilities for the radio equipment and power supplies and

the Micropackage for complete package installation.

Equipment is designed for use in pipeline, power company, railroad, land transportation, forestry and similar cross-country applications requiring a large number of communications channels.

Trained Sprayers Preferred

Spray operators spend a larger share of the production dollar than usually credited to them, says L. W. Lammiman, technical service manager of the DeVilbiss Co., Toledo, O. Importance of spray operators should be recognized and steps taken to improve their type, technique and knowledge of equipment and material.

More than 90 per cent of industrial paint and varnish are spray applied. Factors which influence economical spray application are: Equipment, material, operators and supervision.

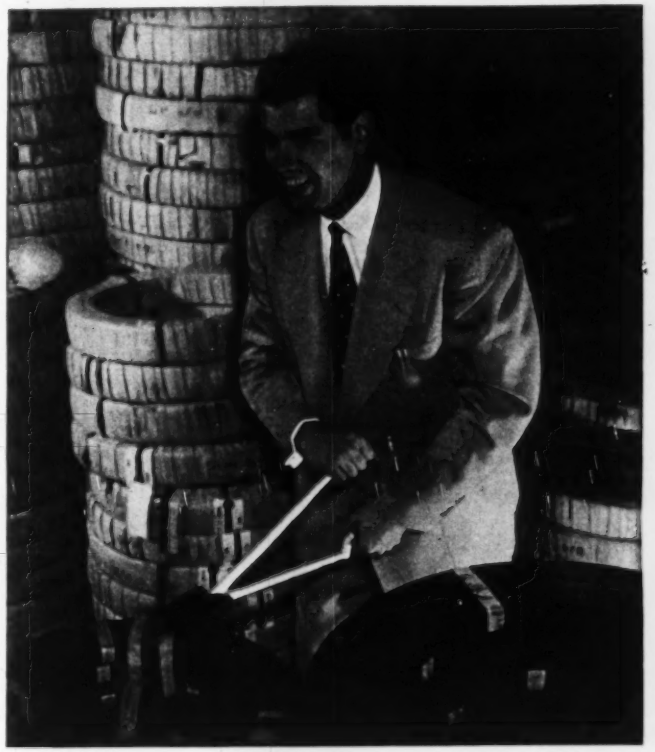
Workmen who are above average should be selected for spraying operations, Mr. Lammiman says. These men should be thoroughly trained by a competent instructor. He should show them the stroking and triggering of the gun, the correct distance of the gun from the surface and how the pattern should be held in relation to the surface. Savings in material alone will more than justify the effort of training the operators.

Balancing Information Given

Section 89 from the first edition of the *Tool Engineers Hand Book* is reprinted in a booklet offered by the Gisholt Machine Co. Called "Static and Dynamic Balancing" it should interest design and methods engineers. Information on the Gisholt balancing school will be included for all requesting the booklet. Requests should be addressed to the company, Madison 10, Wis.

Products Described

Standardization of their brochure is announced by the Island Equipment Co. Booklet contains literature of equipment they manufacture together with pictures of plant facilities and products. Copies will be sent on application to the company, 27-01 Bridge Plaza N., Long Island City 1, N. Y.



Get **fast** steel strapping service from Brainard!

BILL HOGANSON of San Francisco, like other Brainard Strapping System representatives, knows a good thing when he sees it!

Here, in Brainard's West Coast warehouse, Bill surveys a complete stock of various types and sizes of steel strapping, strapping seals, tools, and accessories. On most items delivery is immediate.

That makes Bill happy, since Brainard representatives sell *with service.* They are warehouse conscious. They give personal attention to your packaging and shipping problems, and see that the right equipment is applied to your operations.

To improve your materials handling, call on Brainard. Representatives and warehouses located throughout the U. S.; in Canada, P. J. McArthur Company, Toronto.

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New Books

Aids in Selecting Right Process

MANUFACTURING PROCESSES, by Myron L. Begeman; cloth, 608 pages, 5½ x 9 inches; published by John Wiley & Sons Inc., New York, N. Y., for $6.00; available from STEEL, Penton Bldg., Cleveland 13, O.

The third edition gives the reader detailed information on all the important manufacturing processes and machines that are available to help him select those best suited to a particular product. It has been completely revised to include the machines, processes and machine tools developed recently.

First half of the well-illustrated book is devoted to foundry practice, pattern work, plastic molding, powder metallurgy, hot and cold working of metals, heat treatment and welding. Second half covers measuring instruments, cutting tools, machines and their accessories. Information is fundamental in character, describing machine or process as well as discussing its range of application and limitations. Material is presented in a logical sequence.

Chapters on special casting methods, welding and allied processes, cold forming of metals and plastic molding have been completely rewritten. New material includes sections on continuous casting of metal, Marforming, hydrodynamic forming, plastic molds, cold and stud welding, multistation transfer machines, tracer-controlled machines, jigs and fixtures, and other recent automatic and semi-automatic production machines.

Covers Foundry Practice

FOUNDRY PRACTICE, by William H. Salmon and Eric N. Simons; cloth, 384 pages, 5½ x 8½ inches; published by Sir Isaac Pitman & Sons Ltd., London, distributed by Pitman Publishing Corp., New York 19, N. Y., for $6.50; available from STEEL, Penton Bldg., Cleveland 13, O.

Here is a comprehensive treatment of foundry work that provides a practical guide for operatives and also an authoritative textbook of the subject, covering the syllabus of the City and Guilds of London Institute for intermediate students and including specimen examination questions.

That the book covers the whole field of foundry practice is obvious from its chapter headings: The blueprint, the pattern, the mold materials, sand mixing and distribution, molding and coremaking, mold drying and core baking, closing and pouring the molds, cast metal, molten metal, fettling operations, heat treatment and quality control. Many

What's in Vermont this month?

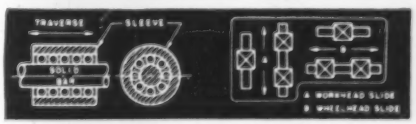
NEW SLIDES ELIMINATE OIL FILM BEARING. Bryant has developed a preloaded ball bearing slide for their internal grinders that is unique in both construction and performance. It comprises sleeves with rows of ball bearings that provide rolling metal-to-metal contact. It forms an extremely sensitive, yet rigid, mounting.

Two of these bearings on one bar maintain axial alignment, a third bearing on another bar gives the slide a widely spaced, three-point support. The Bryant slide resists all lateral thrust since preload is radial. This design avoids the objectionable feature of conventional slides in which the oil film causes a slight flotation resulting in slight misalignment of the members.

One slide under the workhead and one under the wheelhead eliminate a compound slide and keep the workhead and wheel near the bed of the machine for maximum rigidity.

This design was planned for exclusive use on machines of the "high precision" class where a shift of 20 millionths of an inch due to oil film would result in work spoilage.

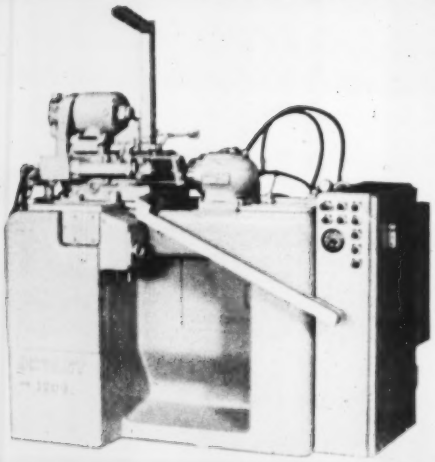
The design has proved so successful, where fast stock removal and extremely close tolerances are required, that this slide is now standard on the Bryant No. 1209 Automatic.



This is an example of how new basic design in modern machine tools can increase your precision production.

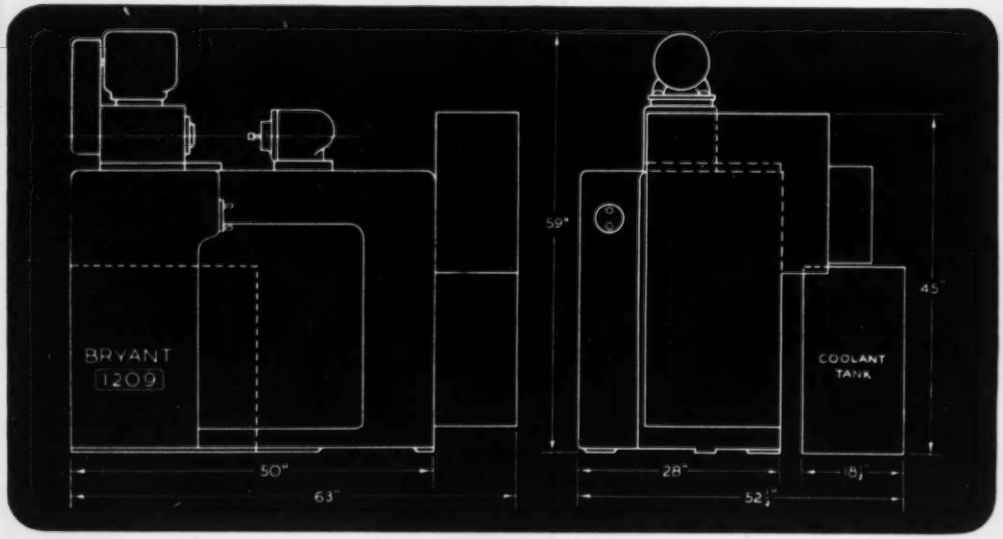
Bryant Chucking Grinder Company in Springfield, Vermont, U.S.A.

FOR HOLE GRINDING

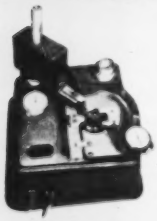


The Bryant 1209 Automatic Hole Grinder

This machine is designed particularly for high production, precision grinding of bores from $\frac{1}{4}$" to 3" in ball bearing races, gears, rolls, bushings, etc. Operator merely loads work, trips a valve to start cycle, and unloads the finished piece. The machine automatically *rough grinds, finish grinds and returns to chucking position when finish size is reached.* Hydraulic control, with individual throttles, gives infinitely variable control for each phase of the grinding cycle. The work spindle and cross feeds are driven by independent D. C. motors, giving infinite speeds and feeds with dial control. Wheel speeds up to 100,000 R.P.M. are obtained with the Bryant Hi-Frequency Wheelhead. Write for folder.



FOR CHECKING SQUARENESS OF UNDER-FACE



Bryant Thread Gage with Squareness-of-under-face Attachment

When an under face must be checked square with an external thread, the part should be held on the thread flank and rotated in this position. The Bryant Gage does this, regardless of variation in roundness, P.D., lead or thread form. The attachment can be adjusted to check the under face of any part which can be held in the gage. Illustrated is the No. 2 gage with a range from 1" P.D. to 2½" P.D. Simultaneous readings can be made — the attachment shows face run-out — the Bryant Thread Gage checks thread size — *giving accumulated reading of P.D., form and lead on dial indicator 4 to 5 times faster than plug gaging.* Send for folder.

Bryant Chucking Grinder Company in Springfield, Vermont, U.S.A.

drawings and photographs are included as well as numerous tables of useful and necessary data.

Human Relationship in Industry

INCENTIVE MANAGEMENT, by James F. Lincoln, president of Lincoln Electric Co.; cloth, 280 pages, 5½ x 9 inches; published by Lincoln Electric Co., Cleveland, O., for $1.00; available from STEEL, Penton Bldg., Cleveland 13, O.

This book gives a new approach to human relationships in industry and business. It presents incentive management as the American answer to the world's social and economic unrest. The discussion is based on the actual record of the Lincoln Electric Co. where the plan has been in operation for 38 years. Actual figures are given in the appendix to support the generalizations given in the text.

Conclusion presented is that American economy must adopt incentive management. We cannot afford to let the outmoded plan of labor-management civil war continue. Americans cannot allow the benighted leadership of government and labor unions to throttle progress.

Story of ALCOA Development

ALCOA, AN AMERICAN ENTERPRISE, by Charles C. Carr; cloth, 292 pages, 6 x 9 inches; published by Rinehart & Co. Inc., New York, N. Y., for $3.50; available from STEEL, Penton Bldg., Cleveland 13, O.

This is the history of the company that is known today as the Aluminum Co. of America. It tells of Charles Martin Hall's discovery of a cheap method of turning bauxite into aluminum by electrolysis. He began this research in a woodshed in Oberlin, O. He then went to Pittsburgh where he met Alfred E. Hunt, a metallurgist who knew something of the metal aluminum and understood the problems that would confront a pioneering project to develop his process. This man, with a group of young Pittsburghers, backed Hall financially and a new business was launched.

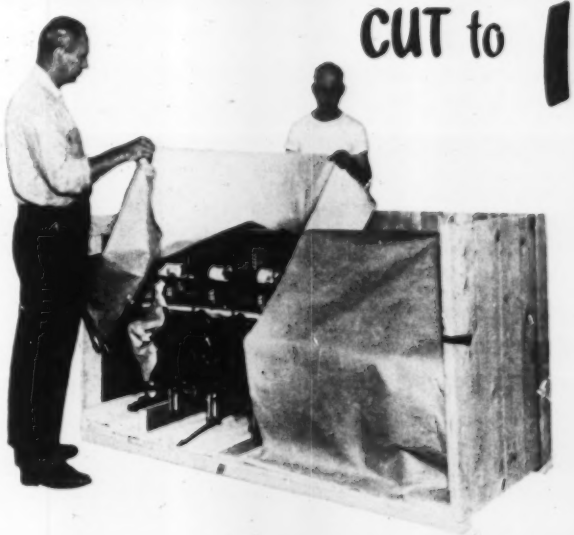
The book goes on to tell of the pioneering mill plant days in the 1880s. It tells of the early struggles for patent rights, for financial backing, for consumer markets. All phases of the company's history are included, whether or not they involved controversy.

Lessons in Welding

ARC WELDING, by Charles H. Zielke; paper-covered; 63 pages, 8½ x 10¾ inches; published by Bruce Publishing Co., Milwaukee, Wis., 80 cents; available from STEEL, Penton Bldg., Cleveland 13, O.

This well-illustrated book covers 40 lessons in welding. General information on nature of welding and equipment, and definitions of impor-

9 hour packaging job CUT to 1½



This Angier Paper STOPS RUST without Grease, Gunk or Goo

Think of your savings!

Here's an exporter who has *scrapped slushing* and all the mess that goes with it! When grease and oil were smeared over these intricate machines, packaging time was over 9 man-hours. Now only 1½ hours does it!

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( ) Steel in process of fabrication.
( ) Instruments and clocks.
( ) Ordnance Equipment.
( ) Others:

tant welding terms are also included. Some of the subjects covered are striking an arc, depositing string beads and parallel beads, effect of arc length, welding of various types of joints, welding of different metals such as light gage steel, stainless, aluminum, etc.

Dimensional Quality Control

THE SCIENCE OF PRECISION MEASUREMENT, heavy paper cover, 256 pages, 6 x 9 inches, published by DoAll Co., Des Plaines, Ill., for $3.50.

This manual interprets the nationally and internationally accepted lineal standard of measurement by giving instruction and showing its practical application to production and inspection of manufactured parts. It explains reading of millionths-of-an-inch with light wave interference bands and shows why such accuracy is necessary to control thousandths-inch production tolerances. This complex subject is simplified through the use of diagrammatic illustrations, charts and photographs.

Practical procedures to be followed in utilizing precision measuring instruments such as gage blocks and gaging instruments are discussed. A new method of measurement using optical flats and the "visible scale" to determine surface flatness, finish, parallelism as well as heights, angles and grain sizes is introduced.

Recommended procedures for statistical sampling of parts for dimensional quality control and a discussion of mobile inspection systems for checking working gages and parts right at point of production are covered. Included are a number of charts and tables from which computations can be made for sines, linear expansion, conversion of fractions to decimals and inches to metric, thread gage tolerances, circumferences and areas of circles, trigonometric solutions to triangles, pin measurements, hardness scales, tapers, etc.

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Heat Transfer Analysis

INDUSTRIAL HEAT TRANSFER, by F. W. Hutchinson; cloth, 326 pages, 6 x 9 inches; published by The Industrial Press, New York 13, N. Y., for $6.00; available from STEEL, Penton Bldg., Cleveland 13, O.

Purpose of this book is to provide a selective, time-saving approach to methods of heat transfer analysis. It presents and discusses equations finding the widest industrial applications, analyzes their applicability and then brings the subject to an eminently practical conclusion by providing graphs which permit direct visual solutions of the most commonly encountered problems. These graphs are equal in accuracy to the equations from which they are derived. Since many equations involve fractional powers and similar complexities, these direct reading graphs not only save time, but also help to eliminate possibility of error in calculations.

At the beginning of each chapter the fundamental theory is discussed and the equations relating to the evaluation of heat transfer coefficients and rates are developed. At the end of the chapter are presented the graphs referred to in the chapter.

Explains Welding Terms

ENCYCLOPAEDIA OF OXYACETYLENE WELDING, by L. J. Tibbenham; cloth, 73 pages, 5 x 8½ inches, published by Sir Isaac Pitman & Sons Ltd., London, available from British Book Centre Inc., New York, for $2.50.

This is a practical work of reference that presents in dictionary form complete and concise information on all matters connected with oxyacetylene welding. It contains tables of data required for welding operations and uses photographs and drawings to illustrate various points.

CALENDAR
OF MEETINGS

April 1-3, Steel Shipping Container Institute: Annual meeting. Hotel Biltmore, Palm Beach, Fla. Institute address: 600 Fifth Ave., New York 20. Secretary: L. B. Miller.

April 1-4, American Management Association: National packaging exposition and conference. Atlantic City Auditorium, Atlantic City, N. J. Association address: 330 W. 42nd St., New York. Secretary: James O. Rice.

April 3-4, Instrument Society of America: Annual steel instrumentation symposium. Hotel Roosevelt, Pittsburgh. Society address: 921 Ridge Ave., Pittsburgh 12. Secretary: Richard Rimbach.

April 4-5, National Association of Cost Accountants: Regional cost conference. Indianapolis. Association address: 505 Park Ave., New York 22. Secretary: A. B. Gunnarson.

April 7-8, American Management Association: Production conference. Hotel Statler, New York. Association address: 330 W. 42nd St., New York. Secretary: James O. Rice.

April 7-9, American Society of Lubrication Engineers: Annual meeting. Hotel Statler, Cleveland. Society address: 343 S. Dearborn St., Chicago 4. Secretary: W. F. Leonard.

April 9, Cutting Tool Manufacturers Association: Spring meeting. Hotel Cleveland, Cleveland. Association address: 416 Penobscot Bldg., Detroit. Secretary: Emil Gairing.

April 9-11, Society of the Plastics Industry Inc.: Annual technical session. Reinforced Plastics Division, Edgewater Beach Hotel, Chicago. Society address: 67 W. 44th St., New York 18. Secretary: William T. Cruse.

April 16-18, American Institute of Electrical Engineers & American Welding Society, Detroit Section: Annual welding conference. Rackham Memorial Bldg., Detroit. Conference publicity: J. S. Francis, Consumers Power Co., Jackson, Mich.

April 17-18, Caster & Floor Truck Manufacturers Association: Spring meeting. Hotel Hollenden, Cleveland. Association address: 7 W. Madison St., Chicago 2. Secretary: Harry P. Dolan.

April 17-18, American Machine Tool Distributors Association: Annual spring meeting. Edgewater Beach Hotel, Chicago. Association address: 1900 Arch St., Philadelphia. Executive secretary: Thomas A. Fernley Jr.

April 18-19, Lead Industries Association: Annual meeting. Hotel Drake, Chicago. Association address: 420 Lexington Ave., New York 17. Secretary: Robert L. Ziegfeld.

April 18-19, National Association of Cost Accountants: Regional cost conference. Atlanta. Association address: 505 Park Ave., New York 22. Secretary: A. B. Gunnarson.

April 18-21, Grinding Wheel Institute: Spring meeting. The Homestead, Hot Springs, Va. Institute address: 2130 Keith Bldg., Cleveland 15. Secretary: Frank G. Gustafson.

April 20-24, National Industrial Service Association: Annual convention. Hotel Conrad Hilton, Chicago. Association address: 818 Olive St., St. Louis 1. Convention publicity: McGiveran-Child Co., 162 N. Clinton St., Chicago 6.

April 21-22, American Coke & Coal Chemicals Institute: Eastern regional meeting. Westchester Country Club, Rye, N. Y. Institute address: 711 14th St., NW, Washington. Executive secretary: Samuel Weiss.

April 21-22, American Zinc Institute Inc.: Annual meeting. Hotel Statler, St. Louis. Institute address: 60 E. 42nd St., New York 17. Secretary: Ernest V. Gent.

April 21-24, Society of Automotive Engineers: National aeronautic and aircraft engineering display. Hotel Statler, New York. Society address: 29 W. 39th St., New York 18. Secretary: John A. C. Warner.

April 23-25, American Institute of Steel Construction Inc.: Spring engineering conference, Hotel Commodore, New York. Institute address: 101 Park Ave., New York 17. Executive vice president: L. Abbett Post.

April 27-May 1, American Ceramic Society: Annual meeting. William Penn Hotel, Pittsburgh. Society address: 2525 N. High St., Columbus, O. Secretary: Charles S. Pearce.

April 28-29, Association of Iron & Steel Engineers: Spring conference. Netherland Plaza Hotel, Cincinnati. Association address: 1010 Empire Bldg., Pittsburgh 22. Managing director: T. V. Ess.

April 28-30, Chamber of Commerce of the U. S.: Annual meeting. Chamber of Commerce Bldg., 1615 H St., NW, Washington 6. Executive vice president: Arch N. Booth.

April 28-May 3, Concrete Reinforcing Steel Institute: Annual meeting. The Greenbrier, White Sulphur Springs, W. Va. Institute address: 38 S. Dearborn St., Chicago 3. Managing director: H. C. Delzell.

April 29-30, Metal Powder Association: Annual spring meeting. Hotel Drake, Chicago. Association address: 420 Lexington Ave., New York 17. Acting secretary: Robert L. Ziegfeld.

April 30-May 4, Industrial Diamond Association of America, Inc.: Annual meeting. Princess Hotel, Bermuda. Association address: 124 E. 40th St., New York. Secretary: Athos D. Leveridge.

May 1-7, American Foundrymen's Society: Annual meeting. Convention Hall, Atlantic City, N. J. Society address: 616 S. Michigan Ave., Chicago. Secretary: W. W. Maloney.

May 1-7, Annual International Foundry Congress & Exposition: Convention Hall, Atlantic City, N. J. Host: American Foundrymen's Society.

May 2-3, Industrial Fasteners Institute: Annual meeting. The Homestead, Hot Springs, Va. Institute address: 3648 Euclid Ave., Cleveland. Secretary: James D. Eggers.

May 4-8, Electrochemical Society Inc.: Semi-annual meeting. Benjamin Franklin Hotel, Philadelphia. Society address: 235 W. 102nd St., New York 25. Secretary: Dr. Henry B. Linford.

May 5-7, Automotive Engine Rebuilders Association: Spring meeting. Hotel Plaza, San

(Continued on p. 116)

What's NEW in NEW Jersey?

There is a brand new surge of industrial activity in New Jersey.

Within a short time—in 1952—the United States Steel Corporation expects to bring into production the great Fairless Works at Morrisville, Pennsylvania.

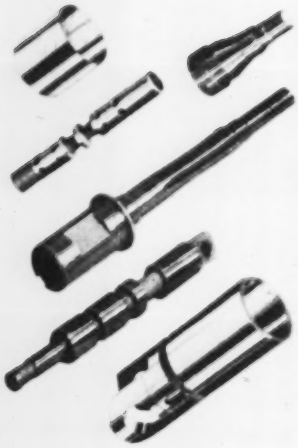
At a future date, down-river on the Delaware, the National Steel Company is to build another large plant at Paulsboro, New Jersey.

Already in anticipation of a nearby source of basic steel, there is activity among fabricators and makers of steel products in their search for suitable acreage for plant sites.

New Jersey offers many advantages to the industrialist who would furnish these mills with products or to him who would draw upon these mills to manufacture goods for the market.

Write for your copy of the new digest about New Jersey — "An Industrialist's View of the Crossroads of the East" — Box C, Public Service Electric and Gas Company, 76 Park Place, Newark, New Jersey.

PUBLIC SERVICE



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OTTAWA OSP INC. STEEL PRODUCTS

OTTAWA STEEL PRODUCTS, INC.
GRAND HAVEN, MICHIGAN

(Continued from p. 115)

Antonio, Tex. Association address: 419 N. Capitol Ave., Indianapolis, Ind. Executive vice president: R. G. Patterson.

May 5-7, American Mining Congress: Annual spring meeting. Netherland Plaza Hotel, Cincinnati. Congress address: 1102 Ring Bldg., Washington 6. Secretary: Julian D. Conover.

May 6-8, National Highway Users' Conference: Highway transportation congress, Washington. Conference address: National Press Bldg., Washington 4. Director: Arthur C. Butler.

May 6-9, Scientific Apparatus Makers Association of America: Annual meeting, Edgewater Beach Hotel, Chicago. Association address: 20 N. Wacker Drive, Chicago 6. Secretary: Kenneth Anderson.

May 7-9, Industrial Waste Conference: Purdue Memorial Union, Purdue University, E. Lafayette, Ind. Secretary: Prof. Don E. Bloodgood, Sanitary Engineering Dept.

May 7-10, National Screw Machine Products Association: Annual spring meeting, Hotel Chase, St. Louis. Association address: 2860 E. 130th St., Cleveland. Executive secretary: Orrin B. Werntz.

May 8-9, The Wire Association: Spring meeting, William Penn Hotel, Pittsburgh. Association address: 453 Main St., Stamford, Conn. Executive secretary: Richard E. Brown.

May 8-9, National Association of Sheet Metal Distributors: Spring meeting, William Penn Hotel, Pittsburgh. Association address: 1900 Arch St., Philadelphia 3. Executive secretary: Thomas A. Fernley Jr.

May 8-9, American Institute of Mining & Metallurgical Engineers: Northwest metals and minerals conference, Davenport Hotel, Spokane, Washington. Publicity director: W. S. Patterson, Kaiser Aluminum & Chemical Corp., Spokane 10.

May 11-14, American Institute of Chemical Engineers: Annual spring meeting, French Lick Springs Hotel, French Lick, Ind. Institute address: 120 E. 41st St., New York 17. Secretary: Stephen L. Tyler.

May 11-14, Industrial Furnace Manufacturers Association: Annual meeting, The Homestead, Hot Springs, Va. Association address: 420 Lexington Ave., New York 17. Secretary: V. P. Gopcevic.

May 12-14, Liquefied Petroleum Gas Association Inc.: Annual meeting and exhibit, Palmer House, Chicago. Association address: 11 S. LaSalle St., Chicago 3. Secretary: Arthur C. Kreutzer.

May 14-15, National Industrial Conference Board: Spring conference, Waldorf-Astoria Hotel, New York. Address: 247 Park Ave., New York 17. Assistant director, conference division: (Mrs.) I. E. Brown.

May 14-16, American Leather Belting Association: Spring meeting, Skytop Lodge, Skytop, Pa. Association address: 320 Broadway, New York 7. Secretary: E. R. Rath.

May 14-16, Society for Experimental Stress Analysis: Spring meeting, Hotel Lincoln, Indianapolis. Society address: Box 168, Cambridge, Mass.

May 18-21, Copper & Brass Research Association: Annual meeting and exhibit, The Homestead, Hot Springs, Va. Association address: 420 Lexington Ave., New York 17. Secretary: Bertram B. Caddle.

May 19, Rail Steel Bar Association: Annual meeting, General Brock Hotel, Niagara Falls, Ont. Association address: 38 S. Dearborn St., Chicago 3. Secretary: W. H. Jacobs.

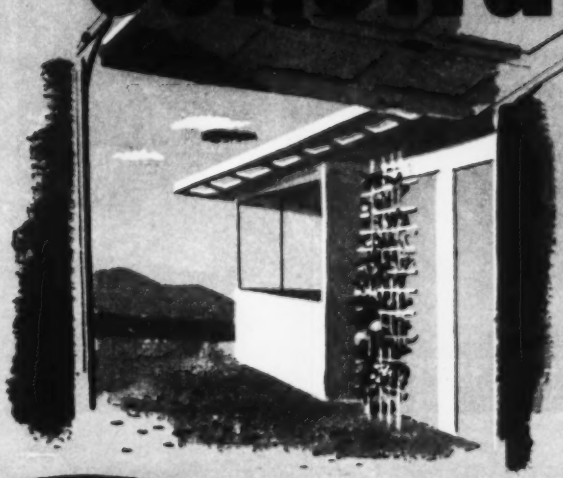
May 19-20, American Steel Warehouse Association Inc.: Annual meeting, Waldorf-Astoria Hotel, New York. Association address: 542 Terminal Tower, Cleveland 13. President: Walter S. Doxsey.

May 19-21, American Supply & Machinery Manufacturers Association: Annual convention and conference booth activity, Hotel Traymore, Atlantic City, N. J. Association address: 731-732 DuPont Circle Bldg., Washington. General manager: R. Kennedy Hanson.

May 19-21, National Industrial Distributors Association: Annual meeting, Atlantic City, N. J. Association address: 1900 Arch St., Philadelphia 3. Secretary: H. R. Rinehard.

Van Huffel
cold-formed metal shapes
and tubing are basic
in better

building construction



Whether hidden from sight doing a functional job or exposed to view just looking pretty, you'll find Van Huffel serving modern building construction needs in practically every nook and corner.

Architects, designers and engineers, knowing the structural advantages and versatility of Van Huffel metal shapes and tubing applications, are continually thinking up new uses. Wherever strength without excessive weight . . . beauty without complicated assembly are necessary characteristics, Van Huffel is basic in better building construction.

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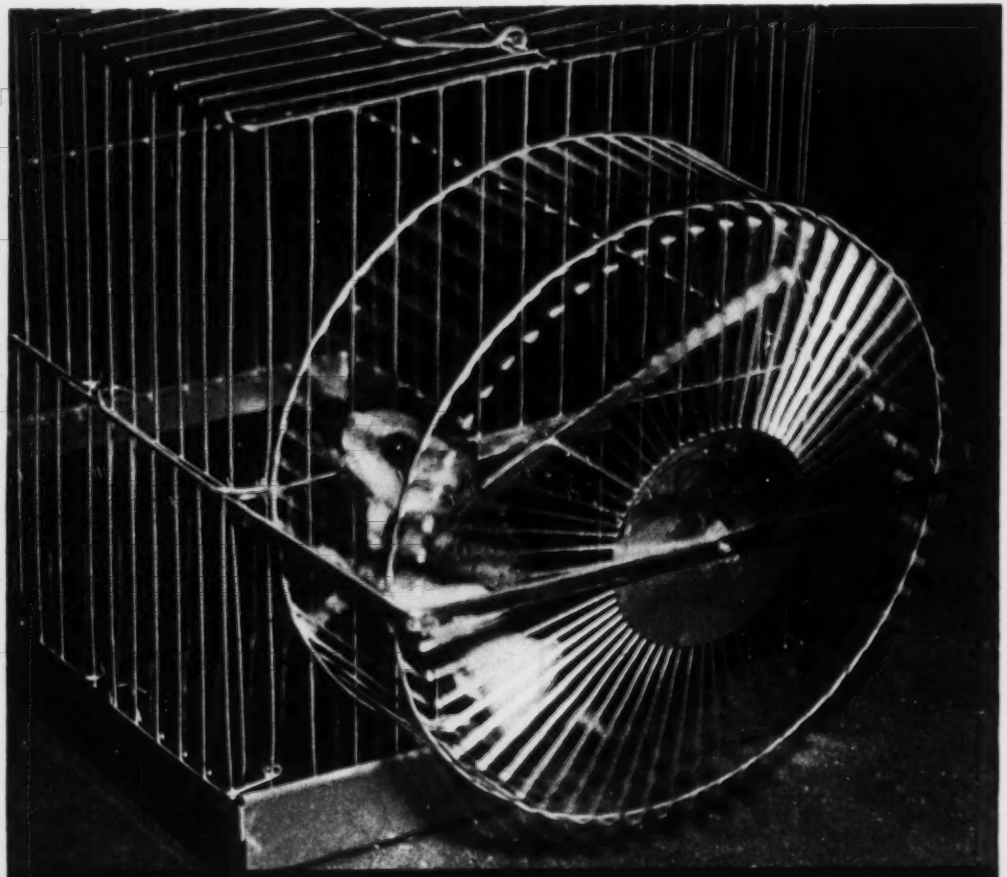
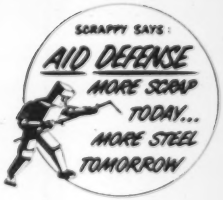
TUBE CORPORATION • WARREN, OHIO

WELDED, LOCK SEAM, OPEN SEAM, BUTTED TUBING, SHAPES AND MOULDINGS



Going round and round with CMP?

Let us try to help you! Call one of our salesmen when you have a problem on CMP. He has handled a large volume of orders certified under CMP regulations and is familiar with the application of these rules to most steel supply problems. He will do everything possible to help you.



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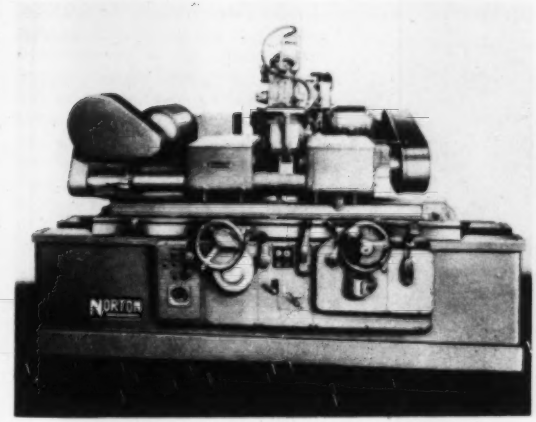
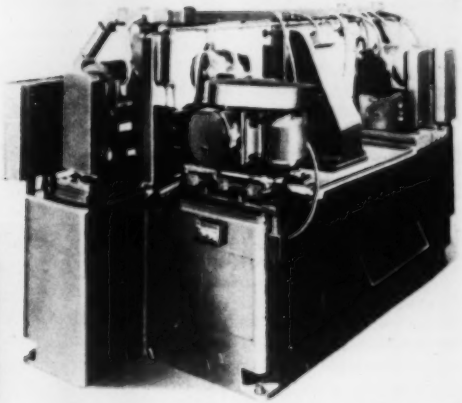
UNITED STATES STEEL

New Products and Equipment



PRODUCTION GRINDING JET TURBINE BLADE SHAPES
. . . external airfoil surfaces worked with precision and speed



MACHINING DIFFERENTIAL PINION SHAFTS
. . . handles 300 pieces per hour at 100 per cent efficiency

Contour Jet Blade Grinder

USE REPLY CARD—CIRCLE No. 1

Compound contour jet blade grinder developed by Norton Co., Worcester, Mass., permits production grinding the external airfoil surfaces of jet engine turbine blade shapes. Development incorporates type CTU grinding machine features in basic design to achieve rapid, precise grinding action. Blades are held on an arbor between synchronously-driven, left and right-hand shape-producing units that impart a figure "8" motion to the arbor for grinding blade forms. Cams in each unit give a rise and fall to the machine's work spindle and an in-and-out swinging motion for controlling blade shape.

Arranging relationship of one unit to the other is possible because of this feature. Thus, the path of rotating work spindles when supporting an arbor can cause a blade to be ground to a varying shape from one end of the piece to another. Work arbor is removable. It is supported by ball-nose type centers held in spindles of shape-producing units.

Volume Delivery Material Pump

USE REPLY CARD—CIRCLE No. 2

Advantages of large paint circulating systems are attributed to the P-QBD volume delivery material pump offered by DeVilbiss Co., Toledo, O. Made for smaller scale maintenance painting, production finishing and coating operations, the pump delivers material directly from its original container to spray gun. This causes sharp reduction in spillage and waste and cuts time loss suffered by frequent replenishing of material.

Two models are offered. One is made for use with common 55-gallon drums; the other has a 10-gallon hinged lid tank into which a standard 5-gallon paint container can be fitted. Both are adapted for direct hose line connection, with a maximum six spray guns operating directly from a single pump. One or more drum-type pumps can be used as nucleus of pipe line circulating system. Here maximum supply potential is eight guns to a pump. Pump can supply 25 ounces of material per minute to eight guns. It develops a peak 200 pounds material delivery pressure.

REPLY CARDS

on page 129 will bring you more information on any new products and equipment in this section.

Automatic Transfer Machine

USE REPLY CARD—CIRCLE No. 3

Progressive in-line type automatic transfer machine introduced by Motch & Merryweather Machinery Co., Penton Bldg., Cleveland 13, O., machines, cuts and chamfers solid cold drawn stock. It feeds stock hydraulically to the first station, which drills from both sides. Second operation is a countersink of the drilled hole. Third and fourth stations broach flats on both sides. Section of the machined stock is held by hydraulic transfer unit and cut at the fifth station. Transfer unit holding machined and cut piece returns to position on the side where two drilling units feed to adjustable stops, chamfering both ends simultaneously.

Machine handles 300 differential pinion shafts per hour at 100 per cent efficiency. It works regular or extruded bar stock, and features rigid holding at each machining station. Through basic design principle, several different machine operations can be performed before stock is cut to accurate length.

Ventilator Moves Air Quickly

USE REPLY CARD—CIRCLE No. 4

Improved device for moving large volumes of air quickly in situations that require intermittent or emergency ventilation is offered by Mine Safety Appliance Co.,

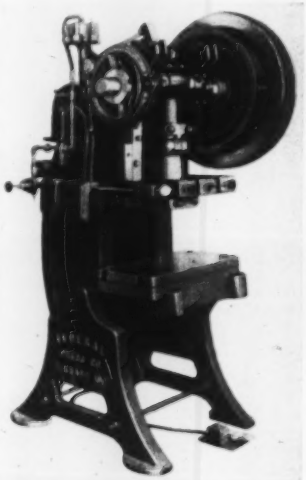
Braddock, Thomas and Meade Sts., Pittsburgh 8, Pa. Portable and lightweight, instrument is adaptable for use in industrial plants, mines or wherever circumstances require removing air contaminants from confined areas or introducing pressure for safe ventilation or rapid cooling. Called the Lamb Air-Mover, the unit is air or steam operated.

Horn shaped, with bell-formed base, the unit converts pressure of compressed air or steam from any supply source. Absence of moving parts makes the ventilator economical and safe. Model 3 moves 800 cfm with 90-pound line pressure; model 6 moves 3150 cfm at 70 pounds and model 10 moves 5160 cfm at 80-pound pressure. Models weigh 6½, 31 and 47 pounds respectively.

Punch Press Line Redesigned

USE REPLY CARD—CIRCLE No. 5

Clutch-brake mechanism and electromatic control are included in redesigned line of punch presses introduced by Federal Press Co., Elkhart, Ind. Clutch operates by compressed air expanding a rubber-and-fabric tube, engaging to any degree of grip required. This actuating tube is molded to the fly wheel structure. Full operating torque results from 360 degrees pressure applied near the fly wheel's maximum diameter.



. . . solenoid synchronizes air actuation

Spring-tension brake is also released by compressed air. A single solenoid synchronizes air actuation of both brake and clutch. Electropneumatic controls permit single tripping with either hand pushbutton or foot control as well as continuous operation. Its nonrepeat mechanism gives desired protection in single-trip operation. Control panel also includes an inching button. Elimination of mechanical levers or linkage makes possible split-second control.

Prefabricated Electric Oven

USE REPLY CARD—CIRCLE No. 6

Jensen Specialties Inc., 9331 Freeland Ave., Detroit 28, Mich., offers a prefabricated electric oven for processed heating. Radiant heat is produced by GE's Calrod tubular, plug-in type heaters having life in excess of 8000 hours. Heaters are mounted in wall panels through a rapid temperature elevation zone. Panels open outwardly to permit servicing all electrical parts outside the oven. Finned

RECLAIM VITAL SCRAP *with a*

Conserve critical metals . . . increase self-sufficiency . . . eliminate scrap handling and storage problems with the press that pays for itself. The MILWAUKEE Briquetting Press automatically converts low-grade bulk borings, turnings, chips and shavings into dense cylindrical briquettes which can be charged directly into furnace or foundry cupolas as high-grade scrap.

Steel, aluminum, cast iron, bronze, magnesium, brass and other metals can be briquetted by a MIL-

SPO MILWAUKEE

CASTINGS ARE PERMANENT

6495 Grand Division Avenue

heaters provide instrument-controlled convection for the temperature holding zones.

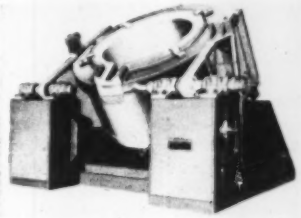
Sequence starting is possible through a master electric control panel. To avoid stripping and refinishing parts, the control panel automatically shuts the system down in event of a fault condition. Heaters and their lock-in type receptacles permit all electrical connections to be made outside of the heating zone.

Melting Pot Tilts Hydraulically

USE REPLY CARD—CIRCLE No. 7

Hydraulic tilting-type melting pot furnace is designed by Bellevue Industrial Furnace Co., 2620 Crane Ave., Detroit, Mich., for use with Kirksite metal. Furnace and pot are tilted by hydraulic cylinders completely piped with flow control valves installed in oil lines. This allows adjustment of flow control to give desired tilting speed. On return stroke, a cam flow adjustment allows a limited rapid return to stop metal pouring. Flow control permits remainder of return stroke to cushion furnace into return position.

Metal is heated by burners mounted below the pot, fired tangentially to the internal lining. This gives a uniform heat distribution and avoids flame impingement



. . . 12½-ton furnace used for Kirksite metal

on the pot. Units can be built for gas, oil, or gas-oil combination firing. Large capacity should permit a single pour to fill a complete mold. Pot size is 76 inches diameter, 37 inches deep.

Ramp Speeds Truck Loading

USE REPLY CARD—CIRCLE No. 8

Steel truck loading ramp made by Penco Engineering Co., 25 California St., San Francisco 11, Calif., is made to speed carrier loading and unloading operations. Operated easily by one man and meeting necessary safety factors, ramp accommodates trucks that are either higher or lower than dock level. Its simplified ramp stop holds it securely in position. Ramp is made of steel safety tread plate, all-welded construction, crowned to compensate for height differences and has safety side rails and beveled edges. Sizes meet all trucking needs from 48 inches wide and 36 inches long to 48 inches wide and 72 inches long with capacities from 4000 to 8000 pounds.

Grinder Handles Medium Work

USE REPLY CARD—CIRCLE No. 9

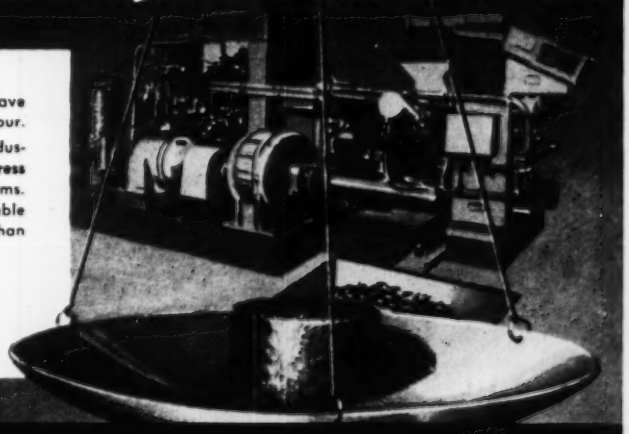
All-purpose grinder made by Porter-Cable Machine Co., Syracuse 8, N. Y., has standard 6-inch belt running over 12½-inch platen for handling medium-size work. Model 506 is used primarily for free-hand applications requiring flat surfaces, deburring, squaring, chamfering, rounding and polishing. Change from vertical to horizontal operation takes about one minute by loosening two hex nuts. Its two-speed pulleys provide for 3300 and 4000 surface feet per

MILWAUKEE BRIQUETTING PRESS

WAUKEE press. Six models are available which have capacities ranging from ¾ to 3½ tons per hour.

Leading manufacturers in the metal working industry are utilizing the **MILWAUKEE Briquetting Press** to solve their vital material and scrap problems. Savings effected by the MILWAUKEE Press enable most users to **write off the entire cost** in less than one year.

Write today for 8-page illustrated Bulletin No. 117 for complete data and specifications.



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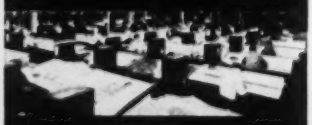

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INQUIRIES PROMPTLY ANSWERED

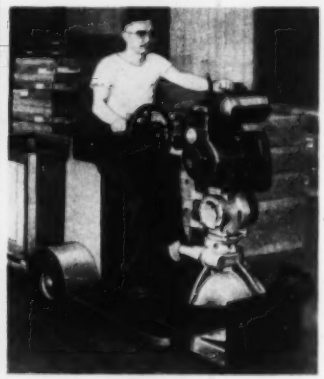
minute. Optional pulleys set for 2400 and 5500 sfm are available at no extra cost.

Pretensioning device eliminates need for releasing entire idler tension pressure each time the belt is changed. An adjustment knob provides speedy belt alignment. Drive unit is 3 hp, 220-440 v, 60-cycle, 3-phase, 1750 rpm. It is totally enclosed with across-the-line starter and wiring. Work table 10 inches wide by 7 inches deep, adjustable to 45 degrees, is available as optional equipment.

Truck Line Adds Tractor Model

USE REPLY CARD—CIRCLE No. 10

Truck-Man Division, Knickerbocker Co., 657 Liberty St., Jackson, Mich., has added a tractor model to its line of industrial trucks. Called model DR, the tractor can haul cargo trains weighing a maximum 12,870 pounds. Its heavy duty air-cooled 5.8-hp engine operates a full 8-hour work shift on about one gallon of gasoline. The model has heavy-duty industrial pneumatic tires all around. Power turret revolves 360 degrees, giving the unit extreme maneuverability.



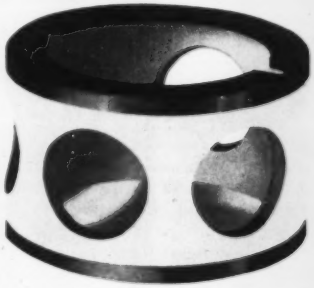
. . . hauls cargo trains to 12,000 pounds

View Screen Built into Millers

USE REPLY CARD—CIRCLE No. 11

Use of a viewing screen on its optically-set Hydroptic-7P and 8P jig boring and milling machines is announced by American SIP Corp., 100 E. 42nd St., New York, N. Y. Graduation lines of the built-in standard scales are projected optically on the screens with a large magnification. They replace micro-

ALL OTHER MATERIALS Failed!



Erie INDUSTRIAL PORCELAIN ENAMEL Did the Job!

A critical moving part in an aircraft fuel selector valve was required to withstand gritty abrasion and the corrosion of aviation gas additives AND operate *dry* through a 10,000 cycle test without failure. Only an ERIE Industrial Porcelain Enameled assembly met *all* requirements.

SOLVE YOUR PROBLEMS WITH PORCELAIN ENAMEL

Erie has specialized in industrial Porcelain Enamel formulas giving specific emphasis to characteristics such as acid and corrosion resistance, heat and thermal shock resistance, abrasion resistance, and lowered coefficients of friction.

You are invited to submit a sketch, sample product or component along with detailed operating conditions for a FREE recommendation regarding the applicability of ERIE Industrial Porcelain Enamel to your problem.

NO OBLIGATION . . . SO WRITE TODAY!
FREE DESCRIPTIVE BULLETIN

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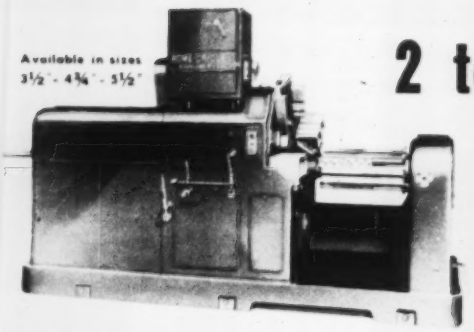
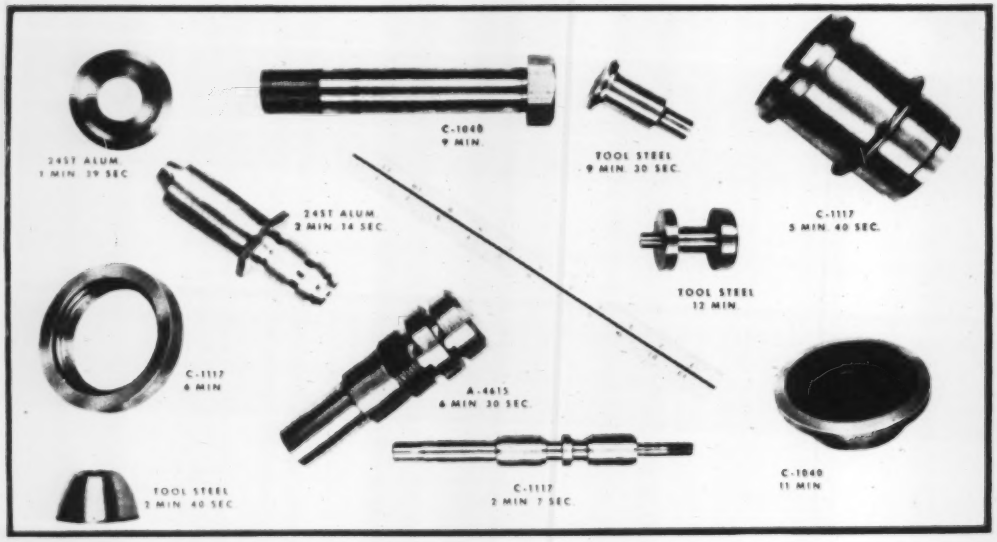


2 to 10 Times Faster!

that's the production increase you can expect when you switch to the new

ACME-GRIDLEY MODEL M

Single Spindle Automatic



Can your present machining methods measure up to these proved examples of Model M production?

Parts shown range up to 8" long and 4" diameter. Lots run as low as 250 pieces, as high as 70,000. These parts, and hundreds of others, were switched from ordinary single spindle machines to the Model M. Here's why:

▶ Eight independently operated tool slides permit use of speeds and feeds best suited to each cut, using carbide or high-speed cutting tools.

▶ Three automatic spindle speed ranges provide correct surface speed for a wide range of diameters.

▶ Turret indexes independently. Several short end operations can be performed while heavy forming cuts are being made from the side slides.

▶ Rugged, open frame provides ample strength to take full advantage of carbide tools, yet plenty of room for chip clearance and easy tool adjustment.

▶ Easily accessible camming minimizes change-over time on small-lot setups—and one man can run several machines.

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Acme-Gridley Bar and Chucking Automatics: 1-4-6 and 8 Spindle • Hydraulic Thread Rolling Machines • Automatic Threading Dies and Taps • The Chronolog-Limit, Motor Starter and Control Station Switches • Solenoids Centrifuges • Contract Manufacturing

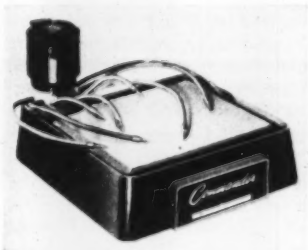
scope eyepieces to avoid eye strain by the operator and speed settings.

Units are built into the bed and crossrail, as well as into the horizontal head on the model SP. In the field, a movable reticle is positioned by micrometer drum reading to 0.0001-inch. Accurate settings are made with the naked eye by simply centering the projected line between reticle beaks using the fine positioning handwheels. Rough settings are made, as previously, from an external scale divided into 0.1-inch.

Table Mounts on Drill Presses

USE REPLY CARD—CIRCLE No. 12

Precision drilling coolant table made by Commander Mfg. Co., 4225 W. Kinzie St., Chicago, Ill., is a precision ground work table with self-contained coolant system. It is made to mount easily on any drill press. Table's built-in coolant system provides one to eight nozzles, individually adjustable as to position and flow, to deliver coolant to the spot and location desired. Because the pump does not have to raise coolant from the floor level, full volume flow is assured. Volume is regulated through the use of a finger-tip control nozzle.



. . . mounts easily on any drill press

Four leveling screws in the base of the table simplify squaring its surface with the drill press spindles. System operates on a 1/25-hp, 1550-rpm, 120-v motor. Hull is semi-rigid, flexible metal.

Acetylene Filling Compressor

USE REPLY CARD—CIRCLE No. 13

Acetylene compressor for cylinder-filling plants is offered by Sight Feed Generator Co., W. Alexandria, O. Compressor receives acetylene from the company's medium pressure continuous-flow gen-

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dependable
respiratory protection
keeps you on the safe side
WILLSON SAFETY EQUIPMENT
Like these comfortable respirators, all Willson safety equipment is made after careful study of industry's needs. Through this continuing research you get many comfort and safety improvements first in Willson products. Ask for Willson—largest line of respirators for industry, farm and home use.
Universal Gas Mask Style WUG
Approved by U. S. Bureau of Mines for toxic smokes and gases, including carbon monoxide.
Chemical Cartridge Respirator No. 831
Protects against common industrial gases and vapors in low concentration. New molded rubber facepiece with flexible rolled edge for extra comfort. Bureau of Mines Approval No. 2302.
No. 880 for metal fumes, mists and dusts
Same facepiece as No. 831, with replaceable dust filters. Comfortable under welding helmet. Bureau of Mines Approval No. 2149.

WILLSON PRODUCTS, Inc., 233 Washington St., Reading, Pennsylvania

See your WILLSON distributor or write for catalog

Use ARCOS Low Hydrogen Electrodes

ARCOS GRADE	A.W.S. SPEC.
Tensilend 70	E7016
Tensilend 100	E10016
Tensilend 120	E12015
Manganend 1M	E9016
Manganend 2M	E10016
Nickend 2	E8015
Chromend 1M	E8015
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Today's demand for increased production makes underbead cracking more costly than ever before. It means valuable time, money, and man-hours lost in rewelding. And there's no need for it. Facts prove that underbead cracking has never been known to occur on welding high tensile steels with "properly designed" low hydrogen electrodes.

As a pioneer in this field, Arcos offers you the most complete line of Low Hydrogen Electrodes—ALL "properly designed"—and backed by the most rigid manufacturing controls in the industry. That's your assurance of consistently high quality weld metal for every job on high tensile steels. Arcos Corporation, 1500 South 50th Street • Philadelphia 43, Penna.

WELD WITH ARCOS

Specialists in Stainless, Low Hydrogen and Non-Ferrous Electrodes

erator without need for gas holders, simplifying installation and operation in filling plants. The M-1 is a four-cylinder, three-stage compressor submerged in water for maintaining acetylene at sufficiently low temperature during the compressing period. In conjunction with the compressor, coolers are designed to assure lowest possible temperature during each of the three compression stages. Integral parts of these coolers are condensation and oil traps for continuous and effective removal of impurities, moisture and oil for each compressor cooling coil. The three-stage model operates at 375 rpm and has capacity of 750 cu ft per hour.

Air-Powered Nut Runner

USE REPLY CARD—CIRCLE No. 14

Model MA-25 air-powered nut runner, announced by Garvin Brothers Inc., South Bend 24, Ind., gives precise torque control in the 0-25-inch-pound range. Gearing is available to extend this range to 40 inch-pounds. Tool is for use on production jobs where too much torque would cause breakage or distortion of light metal parts, castings or plastic.

Rust Inhibiting Metal Cleaner

USE REPLY CARD—CIRCLE No. 15

Designated as EC-51, a rust-inhibiting organic type metal cleaner is announced by Pennsylvania Salt Mfg. Co., Philadelphia 7, Pa. It is used in concentrated or diluted form and can be applied by spray or immersion methods. Cleaner is noncaustic, nonexplosive and does not create toxic working conditions.

Trolleys Insulate Conductors

USE REPLY CARD—CIRCLE No. 16

Designed to insulate bare figure-8 bar conductors, a trolley system is introduced by Benbow Mfg. Co., Burlingame, Calif. It can be applied to existing conductors without dismantling or installed as a new system.

External Wrenching Nut

USE REPLY CARD—CIRCLE No. 17

An external wrenching nut for use wherever space is at a premium and high tensile strength a must, is available from Standard

Pressed Steel Co., Jenkintown, Pa. Known as Flexloc, it has a large bearing surface and 12-point serrations to fit standard box or socket wrenches. It does not have to seat to lock and locks securely in any position on a threaded member.

Burner Changes Fuels Quickly

USE REPLY CARD—CIRCLE No. 18

Fyr-Matic gas-oil burner, offered by Eclipse Fuel Engineering Co., Rockford, Ill., is designed for use in applications where both oil and gas are available. Changeover from one fuel to the other is made instantly and automatically by the flick of a switch.

Knockouts Cut Installation Time

USE REPLY CARD—CIRCLE No. 19

Square D Co., Milwaukee, Wis., offers matching knockouts to eliminate time-consuming conduit bending when ganging electrical devices. These tangent knockouts provide ½ - ¾-inch concentric knockouts with larger knockouts in a tangent pattern. Common center is a constant distance from rear of the enclosure. This automatically positions tangent pattern.

Knock-Down Stacking Box

USE REPLY CARD—CIRCLE No. 20

A heavy duty knock-down stacking box that takes loads up to 4000-5000 pounds and may be used as a stacking box, bin or pallet, is made by Paltier Corp., Michigan City, Ind. It consists of a heavy duty wood pallet and four interlocking wood side panels.

Small Plier-Snip

USE REPLY CARD—CIRCLE No. 21

Utica Drop Forge & Tool Corp., Utica, N. Y., is offering a 4½-inch plier-snip designated as No. 101. It has a wide range of applications wherever fine wire cutting or thin metal snipping is encountered.

End Mills, Die Cutters

USE REPLY CARD—CIRCLE No. 22

Metal Removal Co., Chicago, Ill., introduces a line of end mills and die sinking cutters. They are available in a wide range of standard sizes, single and double end

Use ARCOS Stainless Electrodes

Dependable weld performance on stainless fabrication requires weld metal with the correct chemical composition. And you want to be sure that the electrodes you use will produce the same dependable results on job after job.

The Arcos quality controls give you this assurance with every lot of Stainless Electrodes you receive. From the chemical analysis of the raw materials, to the analysis of actual weld metal, every control test is applied to assure you chemically correct weld metal at all times. In your own plant that can mean improved welding performance . . . fewer rejects . . . lower weld costs.

New chart of typical weld metal analysis tells what Arcos electrodes deliver. Copy on request. Arcos Corporation • 1500 South 50th Street • Philadelphia 43, Penna.

WELD WITH

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Specialists in Stainless, Low Hydrogen and Non-Ferrous Electrodes

What Mrs. Updyke doesn't know she knows

This housewife never saw a metal forming press, and "stamping" to her is what you do to letters or with your feet. But when it comes to buying metal articles—appliances, pans, or what have you—Mrs. Updyke almost invariably picks the ones that are press manufactured.

She doesn't know why, isn't even aware that she's showing a preference for a certain kind of manufacturing. But she likes the smooth surfaces and flowing lines that mark the press-made article. She likes the lighter weight. Being a woman, she likes the prices that up-to-date press methods make possible.

Your sales manager knows there are millions of housewives with these very same fixed preferences. As you plan your future production, and future models, it will pay you to consider modern press methods if you want to capture big markets in a highly competitive tomorrow. The first step is to consult Clearing—today.

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type, small and large diameters, two, three or four flutes, straight or spiral flute, straight or ball ends.

Drafting Machines Scales

USE REPLY CARD—CIRCLE No. 23

Duraline metal drafting machine scales are introduced by Universal Drafting Machine Corp., Cleveland, O. Line consists of 12 standard types of graduations commonly used; each style is available in 6, 12, 18 and 24-inch lengths.

Removes Rust, Treats Metal

USE REPLY CARD—CIRCLE No. 24

Known as Rustclean, a chemical treatment that removes rust, tarnish and light oil, chemically prepares metals for paint and retards corrosion, is announced by Octagon Process Inc., Staten Island, N. Y. It forms a phosphate coating that acts as a base for organic finishes.

Industrial Instrument Pen

USE REPLY CARD—CIRCLE No. 25

Industrial instrument pens that eliminate flooding and reduce paper plugging and choking are available from Minneapolis-Honeywell Regulator Co., Philadelphia 44, Pa. They have removable tips and operate with decreased pressure on the instrument chart.

Fog Nozzle for Large Fires

USE REPLY CARD—CIRCLE No. 26

A giant-size fog nozzle to combat large fires is announced by Bete Fog Nozzle Inc., Greenfield, Mass. Model 500 delivers a 500-gallon per minute fog blanket with a large diameter of coverage and an effective reach of about 80 feet.

Safety Hammer Improved

USE REPLY CARD—CIRCLE No. 27

Flex-Flo safety hammer, made by Custanite Corp., Larchmont, N. Y., consists of a malleable met-

USE A REPLY CARD

Just circle the corresponding number of any item in this section for more information.

Yours FOR THE ASKING

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72. Rotary Shears

Kling Bros. Engineering Works—Line of rotary shears for sheet and plate cutting is described and illustrated in 8-page catalog No. 245A. Specifications of various models, construction features and attachments are covered. Machines cut straight lines, large or small rings and circles, flanges, inside holes, bevels, reverse curves, beads and U's.

73. Inclinable Punch Presses

L & J Press Corp.—Detailed specifications, photographs and general information on line of open back inclinable punch presses is given in 4-page catalog L-9. Back geared, plain flywheel types are included. Capacities range from 6 to 50 tons.

74. Plating Power Source

Bart-Messing Corp.—"A Guide to Better Plating Power" is just what it's title implies. This illustrated catalog presents complete information on a line of Sel-Rex selenium rectifiers which provides direct current for every electroplating, electropolishing, electrocleaning and electrochemical need.

75. Die Steels

Latrobe Electric Steel Co.—Properties and general applications of Latrobe Hi Carbon and Hi Chromium die steels are charted and diagrammed in 4-page folder entitled "The Selection and Use of 'Desegatized' Hi Carbon-Hi Chromium Die Steels."

76. Welding Electrode Chart

General Electric Co., Welding Div.—You can now send for this 4-page electrode-selector chart listing proper electrodes to be used in welding of various metals. Bulletin GEC-857B presents up-to-date condensed information on recommended electrodes for welding of mild steel, stainless, low hydrogen-low alloy steels, low alloy-high tensile steels, cast-iron, bronze and other metals.

77. Cushioned Valves

Golden Anderson Valve Specialty Co.—8-page illustrated bulletin G-3 describing features of cushioned automatic water and steam valves, covers float, altitude, check, solenoid-operated, reducing, relief and nonreturn valves and other type valves used in industry.

78. Buffing & Polishing Sections

Hanson-Van Winkle-Munning Co.—Sisalin sections for both buffing and polishing, plus those with special stiffening impregnation for added cutting properties, are described and illustrated in bulletin SS-100. Sections can be combined to form wheels of any desired thickness. How they can be used for eight different operations, specifications and field performance are given.

79. Packaging Ideas

Hinde & Dauch Paper Co.—Attractive is the word for and attractiveness is the theme of this 28-page booklet "Pack To Attract," a portfolio of merchandising ideas as related to packaging. What eye-catching packages can do for your product, plus the protection, compactness and performance features offered, are shown in word and picture.

80. Shaker Hearth Furnaces

Hevi Duty Electric Co.—Shaker hearth furnaces, designed for production carburizing, cyaniding and hardening and similar operations up to 1900° F, are described and illustrated in 4-page bulletin HD-850. Construction details, operation, quench system, temperature control and special designed are explained. Typical work and specifications are shown.

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81. Punches & Dies

T. H. Lewthwaite Machine Co.—22 pages of dimensional data tabulated for easy reference covers strain shank and headed punches; round, flat top eccentric, beveled top eccentric and rectangular dies; Whitney machine punches and dies; die holder bushings, bars and die beds; baseboard machines; coupling nuts; chucks; other Whitney tools; shears; and cutters.

82. Milling Cutters

Gorham Tool Co.—Revised standards on concave, convex and corner rounding cutters can be found in catalog pages 46, 47 and 48. Revisions affect outside diameter and hole size of tools and make them conform to the new accepted standards being used throughout the metal cutting tool industry.

83. Practical Dimensioning

Gisholt Machine Co.—Fundamentals of dimensioning engineering drawings are covered in detail in this 40-page well-illustrated manual "Practical Dimensioning" by E. C. Helmke. Designated as form 1180, it points out that poor dimensioning practice can add tremendously to product cost and that good practice consists of avoiding the accumulation of tolerances. Text makes use of 26 mechanical drawings, each with explanatory material.

84. Socket Cap Screws

Holo-Krome Screw Corp. — Thin heads, nondeforming sockets and greater strength of button head socket cap screws, is subject of 4-page illustrated folder BH-3010. Reference piece for designers, engineers and production men gives features and sizes of fasteners.

85. Cold-Finished Steel

Jones & Laughlin Steel Corp.—"You Can Make Them Better with Cold-Finished Jalcase" is title of 12-page illustrated brochure which gives analyses, machinability information, distortion data, heat treatments, wear resistance, mechanical properties, special treatments and Electreat process data. Much information is in table form and list of typical uses is given.

86. Bearing-izing Tools

Cogsdill Twist Drill Co.—Bearing-izing, a process for surface finishing and sizing holes, concentric flat surfaces, round shafts, stems, hubs and many contours, is described in 4-page bulletin. Ultra-Surface produces improved accuracy, condenses grain structure, increases wear life, renders parts more resistant to corrosion and improves lubrication conditions.

87. Resistance Thermometers

Leeds & Northrup Co.—Entire line of general-purpose and specialized Thermohms (resistance thermometers) used to detect temperatures between —325° and 1000° F with accuracies from 0.01° to 3.0° F are fully described and illustrated in 36-page catalog and buyers guide EN-84. Featured is 5-page tabular guide which indicates thermometer to use for applications in ceramics, chemical, food and drug, glass, iron and steel, nonferrous metals, petroleum, power, plastics and textile industries.

EDITORIAL REPRINTS:

88. Electrolytic Grinding

Principle of removing stock by electrochemical action as applied to the grinding of difficult-to-machine metals and metal carbides is discussed in STEEL reprint entitled "Electrolytic Grinding: Stubborn Alloys Less Formidable." Article covers high current densities, plunge grinding, maintaining gap distance, insulation spacers and tungsten carbides grinding.

89. Mechanical Die Feeds

"Mechanical Die Feeds . . . More Production, Less Effort" is title of STEEL reprint which discusses the sometimes phenomenal production increases that are made possible when mechanical die feeding equipment is used with progressive die stamping operations. Author J. Van Eaton covers mechanical, slide die and hitch feeds and stock straighteners.

90. Steel Extruding

H. J. Altwicker and K. F. Braeuninger of Air Materiel Command, Wright Field, O. point to the many advantages of the versatile extrusion process in producing variety of shapes in STEEL reprint "Steel Extruding . . . Puts the Squeeze on Conventional Forming." Authors compare properties obtained in extruded and rolled material, and offer schematic drawing of press for combining extrusion and forging operations.

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5	15	25	35	45	55	65	75	85	95
6	16	26	36	46	56	66	76	86	96
7	17	27	37	47	57	67	77	87	97
8	18	28	38	48	58	68	78	88	98
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al hammer having hollow chambers, the inner walls of which are corrugated. Under continuous heavy pounding, opposing angles of these corrugations slowly approximate each other at a predetermined rate and prevent mushrooming.

Acid Resistant Belting

USE REPLY CARD—CIRCLE No. 28

Imperial Belting Co., Chicago 23, Ill., has developed an acid-resistant belting for use in stamping, shearing, scrap handling and other operations involving exposure to cutting oils and similar compounds with acid content.

Portable Bolt Cutter

USE REPLY CARD—CIRCLE No. 29

Manco Mfg. Co., Bradley, Ill., has developed model 30-MCC mill type bolt cutter. It features an innovation that permits the cutting blades to be reversed. Blades may be resharpened when necessary. Capacity of the unit is $\frac{1}{2}$-inch diameter bolts or $\frac{5}{8}$-inch diameter steel rod.

Seals Seams, Gaps in Metal

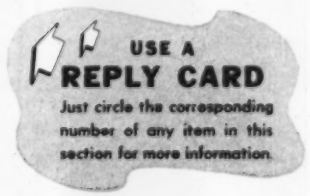
USE REPLY CARD—CIRCLE No. 30

A putty-like material for sealing wide seams and gaps in metal, glass and nonporous surfaces is announced by Minnesota Mining & Mfg. Co., Detroit, Mich. It is a permanently soft, nonshrinking, moisture-proof and weather-resistant synthetic resin material for sealing out dust, drafts and moisture.

Electrode Holder

USE REPLY CARD—CIRCLE No. 31

Caddy type B electrode holder, offered by Erico Products Inc., Cleveland, O., features a cable gripper at the rear of the steel body that prevents any flexing at the weld and eliminates need of insulating the connection. It also has adjustable spring tension.



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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

The Market Outlook

COMPLETE DECONTROL of carbon steel and aluminum will come with the fourth quarter of this year, or certainly no later than the first quarter of 1953—if there's no steelworkers' strike. Virtual agreement on such a timetable for decontrol has been reached by the Defense Production Administration and the National Production Authority.

These two agencies are devising a system to insure that maximum requirements of the armed services and the Atomic Energy Commission will be met in the decontrol period. Use of priority ratings would be restricted to direct military and AEC requirements; all other users would be on their own.

BRIGHT SPOT— Continued improvement in the balance between demand and supply of steel, and other metals too, is reflected also in government allocations of steel, copper products and aluminum for the third quarter of 1952. For the first time since the Controlled Materials Plan was inaugurated last July the materials requirements of many small consumers will be met fully in third-quarter allotments.

To make sure enough CMP materials tickets will be issued to take up all of the steel, copper and aluminum available for the third quarter, the government is increasing its over-allotments. Recent experience shows an increased over-allotment is needed to balance the rate of attrition, the failure to use all of the CMP tickets issued.

BETTER DEAL— Total allotments of controlled materials for the third quarter are: Steel, 25,409,360 tons; copper, 1,511,796 pounds; and aluminum, 803,151 pounds. Second-quarter comparisons are: Steel, 24,710,580 tons; copper, 1,482,030 pounds; and aluminum, 748,773 pounds.

These relaxations in the government attitude toward materials controls should contribute to further easing in the supply stringency. When you know it's going to be easier to get something you aren't as eager to buy more than you need.

The liberalizing of controls is giving users of controlled materials more leeway in getting shipments from distributors: Such shipments now can be made 15 days before the quarter for which a government allotment is valid.

STRAPS OFF STRAPPING— Another relaxation of controls is revocation of the government restriction on use of steel strapping for packaging.

Recognizing the easing in demand for many products and desiring to help support factory employment and output during the second quarter, the government will make heavy procurements of housekeeping items in that period for the military services. Many metalworking companies will be recipients of this business.

Easing of shortages and controls is not without exceptions. The government added to the list of products in which the use of nickel-bearing stainless steel, high nickel alloy steel and nickel silver is prohibited, beginning Apr. 1.

PRICES IN PERIL— All progress toward balance of supply with demand and discarding of government controls would be dashed to bits by a steelworkers' strike that has been a threat the last several weeks. Whether or not there is a strike and a continuation of controls there is strong possibility of higher steel prices, believed by many observers to be the only key to the ultimate settlement of the present wage-price controversy in the steel industry.

Postponement of the strike until Apr. 8 permitted steel production to roll ahead at above-capacity levels. STEEL's national ingot output rate in the week ended Mar. 29 held steady at 102 per cent of capacity.

THE SCORE—Remaining on the list of the hardest-to-get products are heavy and wide carbon plates, large carbon bars, and wide-flange beams. Although increased government allotments of steel to the automobile industry brought a slight stir in the lagging demand for sheets and strip, the overall situation is easy enough to prompt automakers to tell the premium price mills that such prices will have to be cut to the competitive level by third quarter.

NATIONAL STEELWORKS OPERATIONS

DISTRICT INGOT RATES

Percentage of Capacity Engaged at Leading Production Points

	Week Ended Mar. 29	Change	Same Week 1951	Same Week 1950
Pittsburgh	103.5	— .5*	101.5	97.5
Chicago	104.5	— 1*	108	98.5
Mid-Atlantic	99	+ 1	100.5	87
Youngstown	103	0	105	100
Wheeling	100	+ .5	96	101
Cleveland	100	+ 2*	103	99.5
Buffalo	104	0	104	104
Birmingham	102	0	100	100
New England	75	—10	91	82
Cincinnati	98	0*	104	103
St. Louis	86.4	+ 2	95	88.9
Detroit	107.5	+ 3.5*	103.5	106
Western	105	+ 4	102	87
Estimated national rate	102	0	103.5	96

Based on weekly steelmaking capacity of 2,077,040 tons in 1952; 1,999,034 tons for 1951; 1,928,721 tons for second half, 1950; 1,906,268 tons for first half, 1950.

* Change from revised rate for preceding week.

The Metalworking Outlook—p. 37 Production-Engineering News—p. 73

Composite Market Averages

FINISHED STEEL INDEX, Weighted:

	Mar. 27 1952	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av. = 100)	171.92†	171.92	171.92	171.92	118.67
Index in cents per lb.	4.657†	4.657	4.657	4.657	3.215

ARITHMETICAL PRICE COMPOSITES:

Finished Steel, NT	$106.32†	$106.32	$106.32	$106.32	$69.82
No. 2 Fdry. Pig Iron, GT	52.54	52.54	52.54	52.54	32.99
Basic Pig Iron, GT	52.16	52.16	52.16	52.16	32.49
Malleable Pig Iron, GT	53.27	53.27	53.27	53.27	33.71
Steelmaking Scrap, GT	43.00	43.00	43.00	44.00	27.50

Weighted finished steel index based on average shipments and Pittsburgh district prices of the following 14 representative products during 5-year base period 1935-39: Structural shapes, plates, rails, hot-rolled and cold-finished bars, pipe, wire, nails, tin plate, hot and cold-rolled sheets, galvanized sheets, hot and cold-rolled strip. For complete explanation see STEEL, Sept. 19, 1949, p. 54.

Arithmetical steel price composite based on same products as the weighted finished steel index with the exception of rails, cold-finished bars, galvanized sheets and hot-rolled strip.

Basic and No. 2 foundry pig iron composites are based on average prices at Pittsburgh, Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Granite City, Youngstown. Malleable composite based on same points except Birmingham.

Steelmaking scrap composite based on average prices of No. 1 heavy melting steel at Pittsburgh, Chicago and Philadelphia.

† Preliminary.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED MATERIALS

	Mar. 27 1952	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	3.70	3.70	3.70	3.70	2.60
Bars, H.R., Chicago	3.70	3.70	3.70	3.70	2.60
Bars, H.R., del Philadelphia	4.223	4.223	4.223	4.18	2.98
Bars, C.F., Pittsburgh	4.55	4.55	4.55	4.55	3.20
Shapes, Std., Pittsburgh	3.65	3.65	3.65	3.65	2.50
Shapes, Std., Chicago	3.65	3.65	3.65	3.65	2.50
Shapes, del Philadelphia	3.918	3.918	3.918	3.90	2.64
Plates, Pittsburgh	3.70	3.70	3.70	3.70	2.65
Plates, Chicago	3.70	3.70	3.70	3.70	2.65
Plates, Coatesville, Pa.	4.15	4.15	4.15	4.15	2.80
Plates, Sparrows Point, Md.	3.70	3.70	3.70	3.70	2.65
Plates, Claymont, Del.	4.15	4.15	4.15	4.15	2.80
Sheets, H.R., Pittsburgh	3.60-75	3.60-75	3.60-75	3.60-75	2.50
Sheets, H.R., Chicago	3.60	3.60	3.60	3.60	2.50
Sheets, C.R., Pittsburgh	4.35	4.35	4.35	4.35	3.20
Sheets, C.R., Chicago	4.35	4.35	4.35	4.35	3.20
Sheets, C.R., Detroit	4.55	4.55	4.55	4.55	3.35
Sheets, Galv., Pittsburgh	4.80	4.80	4.80	4.80	3.55
Strip, H.R., Pittsburgh	3.75-4.00	3.75-4.00	3.75-4.00	3.75-4.00	2.50
Strip, H.R., Chicago	3.50	3.50	3.50	3.50	2.50
Strip, C.R., Pittsburgh	4.65-5.35	4.65-5.35	4.65-5.35	4.65-5.35	3.20
Strip, C.R., Chicago	4.90	4.90	4.90	4.90	3.30
Strip, C.R., Detroit	4.85-5.60	4.85-5.60	4.85-5.60	4.85-5.60	3.35
Wire, Basic, Pittsburgh	4.85-5.10	4.85-5.10	4.85-5.10	4.85-5.10	3.425
Nails, Wire, Pittsburgh	5.90-6.20	5.90-6.20	5.90-6.20	5.90-6.20	4.125
Tin plate box, Pittsburgh	$8.70	$8.70	$8.70	$8.70	$5.75

SEMIFINISHED

Billets, forging, Pitts (NT)	$66.00	$66.00	$66.00	$66.00	$50.00
Wire rods, ⅜-⅝", Pitts.	4.10-30	4.10-30	4.10-30	4.10-30	2.675

PIG IRON, Gross Ton

Bessemer, Pitts.	$53.00	$53.00	$53.00	$53.00	$34.00
Basic, Valley	52.00	52.00	52.00	52.00	33.00
Basic, del. Phila.	56.61	56.61	56.61	56.39	35.52
No. 2 Fdry, Pitts.	52.50	52.50	52.50	52.50	33.50
No. 2 Fdry, Chicago	52.50	52.50	52.50	52.50	33.00
No. 2 Fdry, Valley	52.50	52.50	52.50	52.50	33.50
No. 2 Fdry, Del. Phila.	57.11	57.11	57.11	56.89	36.02
No. 2 Fdry, Birm.	48.88	48.88	48.88	48.88	29.88
No. 2 Fdry (Birm.) del. Cin.	55.49	55.49	55.49	55.58	34.75
Malleable Valley	52.50	52.50	52.50	52.50	33.50
Malleable, Chicago	52.50	52.50	52.50	52.50	33.50
Charcoal, Lyles, Tenn.	66.00	66.00	66.00	66.00	40.50
Ferromanganese, Etna, Pa.	188.00	188.00	188.00	188.00	140.25*

* F.o.b. cars, Pittsburgh.

SCRAP, Gross Ton (including broker's commission)

No. 1 Heavy Melt. Pitts.	$44.00	$44.00	$44.00	$45.00	$38.00
No. 1 Heavy Melt. E. Pa.	42.50	42.50	42.50	43.50	38.50
No. 1 Heavy Melt. Chicago	42.50	42.50	42.50	43.50	36.00
No. 1 Heavy Melt. Valley	44.00	44.00	44.00	45.00	37.75
No. 1 Heavy Melt. Cleve.	43.00	43.00	43.00	44.00	37.25
No. 1 Heavy Melt. Buffalo	43.00	43.00	43.00	44.00	40.50
Rails, Rerolling, Chicago	52.50	52.50	52.50	52.50	41.50
No. 1 Cast, Chicago	49.00*	49.00*	49.00*	49.00*	43.50

* F.o.b. shipping point.

COKE, Net Ton

Beehive, Furn. Connlsvl.	$14.75	$14.75	$14.75	$14.75	$8.75-$9
Beehive, Fdry., Connlsvl.	17.50	17.50	17.50	17.50	9.75-11.00
Oven Fdry., Chicago	23.00	23.00	23.00	21.00	15.10

NONFERROUS METALS

Copper, del. Conn.	24.50	24.50	24.50	24.50	21.50
Zinc, E. St. Louis	19.50	19.50	19.50	17.50	10.50
Lead, St. Louis	18.80	18.80	18.80	16.80	14.80-14.85
Tin, New York	121.50	121.50	121.50	134.00	70.00
Aluminum, del.	19.00	19.00	19.00	19.00	15.00
Antimony, Laredo, Tex.	50.00	50.00	50.00	42.00	33.00
Nickel, refinery, duty paid	36.50	36.50	36.50	50.50	35.00

PIG IRON

F.o.b. furnace prices quoted under GCPR as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax. Key to producing companies published on second following page.

PIG IRON, Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa. B2	$54.00	$54.50	$55.00	$55.50
Brooklyn, N.Y., del.	....	59.18	59.68	....
Newark, del.	56.87	57.37	57.87	58.37
Philadelphia, del.	56.61	57.11	57.61	58.11
Birmingham District				
Alabama City, Ala. R2	48.38	48.88	....	....
Birmingham R2	48.38	48.88	....	....
Birmingham S9	48.38	48.88	....	....
Woodward, Ala. W15	48.38	48.88	....	....
Cincinnati, del.	....	55.49	....	....
Buffalo District				
Buffalo R2	52.00	52.50	53.00	....
Buffalo H1	52.00	52.50	53.00	....
Tonawanda, N.Y. W12	52.00	52.50	53.00	....
No. Tonawanda, N.Y. T9	....	52.50	53.00	....
Boston, del.	62.11	62.61	63.11	....
Rochester, N.Y., del.	54.88	55.38	55.88	....
Syracuse, N.Y., del.	55.91	56.41	56.91	....
Chicago District				
Chicago I-3	52.00	52.50	52.50	53.00
Gary, Ind. U5	52.00	....	52.50	....
Indiana Harbor, Ind. I-2	52.00	....	52.50	....
So. Chicago, Ill. W14	52.00	52.50	52.50	....
So. Chicago, Ill., Y1	52.00	52.50	52.50	....
So. Chicago, Ill. U5	52.00	....	52.50	53.00
Milwaukee, del.	54.06	54.56	54.56	55.06
Muskegon, Mich., del.	....	58.47	58.47	....
Cleveland District				
Cleveland A7	52.00	52.50	52.50	53.00
Cleveland R2	52.00	52.50	52.50	....
Akron, O., del. from Cleve.	54.61	55.11	55.11	55.61
Lorain, O. N3	52.00	....	....	53.00
Duluth I-3	....	....	52.50	....
Erie, Pa. I-3	52.00	52.50	52.50	53.00
Everett, Mass. E1	....	57.50	58.00	....
Fontana, Calif. K1	58.00	58.50	....	....
Seattle, Tacoma, Wash., del.	....	60.66	....	....
Portland, Oreg., del.	....	60.66	....	....
Los Angeles, San Francisco, del.	60.16	60.66	....	....
Granite City, Ill. G4	53.90	54.40	54.90	....
St. Louis, del. (inc. tax)	54.66	55.16	55.66	....
Ironton, Utah C11	52.00	52.50	....	....
Geneva, Utah C11	52.00	52.50	....	....
Lone Star, Tex. L6	48.00	*48.50	48.50	....
Minnequa, Colo. C10	54.00	55.00	55.00	....
Pittsburgh District				
Neville Island, Pa. P6	....	52.50	52.50	53.00
Pitts., N.&S. sides, Ambridge, Aliquippa, del.	....	53.80	53.80	54.30
McKees Rocks, del.	....	53.54	53.54	54.04
Lawrenceville, Homestead, McKeesport, Monaca, del.	....	54.07	54.07	54.57
Verona, del.	....	54.57	54.57	55.07
Brackenridge, del.	....	54.82	54.82	55.32
Bessemer, Pa. U5	52.00	....	52.50	53.00
Clairton, Rankin, So. Duquesne, Pa. U5	52.00	....	....	....
McKeesport, Pa. N3	52.00	....	....	53.00
Monessen, Pa. P7	54.00	....	....	....
Sharpsville, Pa. S6	....	....	52.50	53.00
Steelton, Pa. B2	54.00	54.50	55.00	55.50
Sweetland, Pa. A3	56.00	56.50	57.00	57.50
Toledo, O. I-3	52.00	52.50	52.50	53.00
Cincinnati, del.	57.47	57.97	....	....
Troy, N.Y. R2	54.00	54.50	55.00	55.50
Youngstown District				
Hubbard, O. Y1	52.00	52.50	52.50	....
Youngstown Y1	52.00	52.50	52.50	....
Youngstown U5	52.00	....	....	53.00
Mansfield, O., del.	56.65	57.15	57.15	57.65

* Low phos, southern grade.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.0-6.50% silicon; add $1.50 for each 0.5% Si)

Jackson, O. G2, J1	$62.50
Buffalo H1	63.75

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $1 for each 0.045% max. P)

Niagara Falls, N.Y. P15	$88.00
Keokuk, Iowa, Openhearth & Fdry, frt. allowed K2	92.50
Keokuk, OH & Fdry., 12½ lb piglets, 16% Si, frt. allowed K2	95.50
Wenatchee, Wash., O.H. & Fdry., frt. allowed K2	92.50

CHARCOAL PIG IRON, Gross Ton

(Low phos semi-cold blast; differential charged for silicon over base grade; also for hard chilling iron Nos. 5 & 6)

Lyles, Tenn. T3	$66.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Cleveland, intermediate, A7	$57.00
Steelton, Pa. B2	60.00
Philadelphia, delivered	62.37
Troy, N.Y. R2	60.00

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Semifinished and Finished Steel Products

Mill prices quoted under GCPR as reported to STEEL, Mar. 27, 1952; cents per pound except as otherwise noted. Changes shown in Italics. Code numbers following mill points indicate producing company; key on next two pages

INGOTS, Carbon, Forging (NT)
Fontana,Calif. K1 ....$79.00
Munhall,Pa. U5 ....52.00

INGOTS, Alloy (NT)
Detroit R7 ....$54.00
Fontana,Calif. K1 ....80.00
Houston,Tex. S5 ....62.00
Midland,Pa. C18 ....54.00
Munhall,Pa. U5 ....54.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bessemer,Pa. U5 ....$56.00
Clairton,Pa. U5 ....56.00
Ensley,Ala. T2 ....56.00
Fairfield,Ala. T2 ....56.00
Fontana,Calif. K1 ....75.00
Gary,Ind. U5 ....56.00
Johnstown,Pa. B2 ....56.00
Lackawanna,N.Y. B2 ..56.00
Munhall,Pa. U5 ....56.00
So.Chicago,Ill. U5 ....56.00
So.Duquesne,Pa. U5 ..56.00

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$66.00
Buffalo R2 ....66.00
Canton,O. R2 ....66.00
Clairton,Pa. U5 ....66.00
Cleveland R2 ....66.00
Conshohocken,Pa. A3 ..73.00
Detroit R7 ....69.00
Ensley,Ala. T2 ....66.00
Fairfield,Ala. T2 ....66.00
Fontana,Calif. K1 ....85.00
Gary,Ind. U5 ....66.00
Geneva,Utah C11 ....66.00
Houston,Tex. S5 ....74.00
Johnstown,Pa. B2 ....66.00
Lackawanna,N.Y. B2..66.00
LosAngeles B3 ....85.00
Munhall,Pa. U5 ....66.00
Seattle B3 ....85.00
So.Chicago R2,U5,W14 66.00
So.Duquesne,Pa. U5 ..66.00
So.SanFrancisco B3 ..85.00

Alloy, Forging (NT)
Bethlehem,Pa. B2 ....$70.00
Buffalo R2 ....70.00
Canton,O. R2 ....70.00
Canton,O.(29) T7 ....66.00
Conshohocken,Pa. A3 ..77.00
Detroit R7 ....73.00
Fontana,Calif. K1 ....89.00
Gary,Ind. U5 ....70.00
Houston,Tex. S5 ....78.00
Ind.Harbor,Ind. Y1 ....70.00
Johnstown,Pa. B2 ....70.00
Lackawanna,N.Y. B2 ..70.00
LosAngeles B3 ....90.00
Massillon,O. R2 ....70.00
Midland,Pa. C18 ....70.00
Munhall,Pa. U5 ....70.00
So.Chicago R2,U5,W14 70.00
So.Duquesne,Pa. U5 ..70.00
Struthers,O. Y1 ....70.00
Warren,O. C17 ....70.00

ROUNDS, SEAMLESS TUBE (NT)
Canton,O. R2 ....$82.00
Cleveland R2 ....82.00
Fontana,Calif. K1 ....103.00
Gary,Ind. U5 ....82.00
Massillon,O. R2 ....82.00
So.Chicago,Ill. R2 ....82.00
So.Duquesne,Pa. U5 ..82.00

SHEET BARS (NT)
Fontana,Calif. K1 ....$89.00

SKELP
Aliquippa,Pa. J5 ....$3.45
Munhall,Pa. U5 ....3.35
Warren,O. R2 ....3.35
Youngstown R2, U5 ....3.35

WIRE RODS
Alton,Ill. L1 ....4.40
AlabamaCity,Ala. R2 ..4.10
Buffalo W12 ....4.10
Cleveland A7 ....4.10
Donora,Pa. A7 ....4.10
Fairfield,Ala. T2 ....4.10
Fontana,Calif. K1 ....4.90
Houston,Tex. S5 ....4.50
Johnstown,Pa. B2 ....4.10
Joliet,Ill. A7 ....4.10
LosAngeles B3 ....4.90
Minnequa,Colo. C10 ....4.35
Monessen,Pa. P7 ....4.30
No.Tonawanda,N.Y. B11..4.10
Pittsburg,Calif. C11 ....4.75
Portsmouth,O. P12 ....4.30
Roebling,N.J. R5 ....4.20
So.Chicago,Ill. R2 ....4.10
SparrowsPoint,Md. B2..4.20
Sterling,Ill.(1) N15 ....4.10
Struthers,O. Y1 ....4.10
Torrance,Calif. C11 ....4.90
Worcester,Mass. A7 ....4.40

SHEET STEEL PILING
Ind.Harbor,Ind. I-2 ....4.45
Lackawanna,N.Y. B2 ....4.45
Munhall,Pa. U5 ....4.45
So.Chicago,Ill. U5 ....4.45

STRUCTURALS
Carbon Steel Stand. Shapes
AlabamaCity,Ala. R2 ..3.80
Aliquippa,Pa. J5 ....3.65
Bessemer,Ala. T2 ....3.65
Bethlehem,Pa. B2 ....3.70
Clairton,Pa. U5 ....3.65
Fairfield,Ala. T2 ....3.65
Fontana,Calif. K1 ....4.25
Gary,Ind. U5 ....3.65
Geneva,Utah C11 ....3.65
Houston,Tex. S5 ....4.05
Ind.Harbor,Ind. I-2 ....3.65
Johnstown,Pa. B2 ....3.70
KansasCity,Mo. S5 ....4.25
Lackawanna,N.Y. B2 ....3.70
Los Angeles B3 ....4.25
Minnequa,Colo. C10 ....4.10
Munhall,Pa. U5 ....3.65
Niles,Calif.(22) P1 ....4.85
Phoenixville,Pa. P4 ....5.90
Portland,Oreg. O4 ....4.50
Seattle B3 ....4.30
So.Chicago,Ill. U5, W14 3.65
So.SanFrancisco B3 ....4.20
Torrance,Calif. C11 ....4.25
Weirton,W.Va. W6 ....3.90

Alloy Stand. Shapes
Clairton,Pa. U5 ....4.35
Fontana,Calif. K1 ....5.55
Munhall,Pa. U5 ....4.35
So.Chicago,Ill. U5 ....4.35

H.S., L.A. Stand. Shapes
Aliquippa,Pa. J5 ....5.50
Bessemer,Ala. T2 ....5.50
Bethlehem,Pa.(14) B2..5.50
Clairton,Pa. U5 ....5.50
Fairfield,Ala. T2 ....5.50
Fontana,Calif. K1 ....6.10
Gary,Ind. U5 ....5.50
Geneva,Utah C11 ....5.50
Ind.Harbor,Ind. I-2 ....5.50
Ind.Harbor,Ind. Y-1 ....6.00
Johnstown,Pa. B2 ....5.50
Lackawanna,N.Y.(14) B2 5.50
LosAngeles B3 ....6.65
Munhall,Pa. U5 ....5.50
Seattle B3 ....6.10
So.Chicago,Ill. U5 ....5.50
So.SanFrancisco B3 ....6.00
Struthers,O. Y1 ....6.00

Wide Flange
Bethlehem,Pa. B2 ....3.70
Clairton,Pa. U5 ....3.65
Fontana,Calif. K1 ....4.65
Lackawanna,N.Y. B2 ....3.70
Munhall,Pa. U5 ....3.65
So.Chicago,Ill. U5 ....3.65

H.S., L.A. Wide Flange
Bethlehem,Pa. B2 ....5.50
Lackawanna,N.Y. B2 ..5.50
Munhall,Pa. U5 ....5.45
So.Chicago,Ill. U5 ....5.45

BEARING PILES
Munhall,Pa. U5 ....3.65
So.Chicago,Ill. U5 ....3.85

PLATES,High-Strength Low-Alloy
Aliquippa,Pa. J5 ....5.65
Bessemer,Ala. T2 ....5.65
Clairton,Pa. U5 ....5.65
Cleveland J5, R2 ....5.65
Conshohocken,Pa. A3 ..5.90
Fairfield,Ala. T2 ....5.65
Fontana,Calif.(30) K1 ..6.25
Gary,Ind. U5 ....5.65
Geneva,Utah C11 ....5.65
Ind.Harbor,Ind. I-2 ....5.65
Ind.Harbor,Ind. Y-1 ....6.15
Johnstown,Pa. B2 ....5.65
Munhall,Pa. U5 ....5.65
Pittsburgh J5 ....5.65
Seattle B3 ....6.55
Sharon,Pa. S3 ....5.70
So.Chicago,Ill. U5 ....5.65
SparrowsPoint,Md. B2 ..5.65
Warren,O. R2 ....5.65
Youngstown Y1 ....6.15

PLATES, Open-Hearth Alloy
Claymont,Del. C22 ....6.85
Coatesville,Pa. L7 ....5.25
Conshohocken,Pa. A3 ..5.60
Fontana,Calif. K1 ....5.70
Gary,Ind. U5 ....4.75
Johnstown,Pa. B2 ....4.75
Munhall,Pa. U5 ....4.75
Sharon,Pa. S3 ....5.20
So.Chicago,Ill. U5 ....4.75
SparrowsPoint,Md. B2 ..4.75

FLOOR PLATES
Cleveland J5 ....4.75
Conshohocken,Pa. A3 ..4.75
Ind.Harbor,Ind. I-2 ....4.75
Munhall,Pa. U5 ....4.75
So.Chicago,Ill. U5 ....4.75

PLATES, Ingot Iron
Ashland,c.l. (15) A10. .3.95
Ashland,l.c.l. (15 A10 ....4.45
Cleveland,c.l. R2 ....4.30
Warren,O.c.l. R2 ....4.30

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..3.70
Aliquippa,Pa. J5 ....3.70
Ashland,Ky. (15) A10 ..3.70
Bessemer,Ala. T2 ....3.70
Clairton,Pa. U5 ....3.70
Claymont,Del. C22 ....4.15
Cleveland J5, R2 ....3.70
Coatesville,Pa. L7 ....4.15
Conshohocken,Pa. A3 ..4.15
Fairfield,Ala. T2 ....3.70
Fontana,Calif.(30) K1 4.30
Gary,Ind. U5 ....3.70
GraniteCity,Ill. G4 ....4.40
Geneva,Utah C11 ....3.70
Harrisburg,Pa. C5 ....6.30
Houston,Tex. S5 ....4.10
Ind.Harbor,Ind. I-2, Y1 3.70
Johnstown,Pa. B2 ....3.70
Lackawanna,N.Y. B2 ..3.70
Minnequa,Colo. C10 ....4.50
Munhall,Pa. U5 ....3.70
Pittsburgh J5 ....3.70
Seattle B3 ....4.60
Sharon,Pa. S3 ....3.95
So.Chicago,Ill. U5 W14 3.70
SparrowsPoint,Md. B2..3.70
Steubenville,O. W10 ....3.70
Warren,O. R2 ....3.70
Weirton,W.Va. W6 ....4.00
Youngstown R2, U5, Y1 3.70

PLATES, Carbon A.R.
Fontana,Calif. K1 ....5.45
Geneva,Utah C11 ....4.85

PLATES, Wrought Iron
Economy,Pa. B14 ....8.60

BARS, Hot-Rolled Carbon
AlabamaCity,Ala. R2 ..3.70
Aliquippa,Pa. J5 ....3.70
Alton,Ill. L1 ....4.15
Atlanta,Ga. A11 ....4.25
Bessemer,Ala. T2 ....3.70
Buffalo R2 ....3.70
Canton,O. R2 ....3.70
Clairton,Pa. U5 ....3.70
Cleveland R2 ....3.70
Detroit R7 ....3.85
Emeryville,Calif. J7 ....4.45
Fairfield,Ala. T2 ....3.70
Fontana,Calif. K1 ....4.40
Gary,Ind. U5 ....3.70
Houston,Tex. S5 ....4.10
Ind.Harbor,Ind. I-2 Y1 3.70
Johnstown,Pa. B2 ....3.70
KansasCity,Mo. S5 ....4.30
Lackawanna,N.Y. B2 ....3.70
LosAngeles B3 ....4.40
Milton,Pa. B6 ....4.55
Minnequa,Colo. C10 ....4.15
Niles,Calif. P1 ....5.05
N.Tonawanda,N.Y. B11..3.70
Pittsburg,Calif. C11 ....4.40
Pittsburgh J5 ....3.70
Portland,Oreg. O4 ....4.65
Seattle B3, N14 ....4.45
Struthers,O. Y1 ....3.70
Torrance,Calif. C11 ....4.40
Weirton,W.Va. W6 ....3.85
So.Chicago R2, U5, W14..3.70
So.Duquesne,Pa. U5 ....3.70
So.SanFran.,Cal. B3 ....4.45
Youngstown R2, U5 ....3.70

BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 ....3.70
Atlanta A11 ....4.25
Johnstown,Pa. B2 ....3.70
Lackawanna,N.Y. B2 ....3.70
Niles,Calif. P1 ....5.05
Portland,Oreg. O4 ....4.65
SanFrancisco 87 ....4.85

BAR SIZE ANGLES; H.R. CARBON
Bethlehem,Pa. B2 ....3.90

BARS, Hot-Rolled Alloy
Bethlehem,Pa. B2 ....4.30
Buffalo R2 ....4.30
Canton,O. R2 ....4.30
Canton,O.(29) T7 ....3.95
Clairton,Pa. U5 ....4.30
Detroit R7 ....4.45
Ecorse,Mich. G5 ....4.65
Fontana,Calif. K1 ....5.35
Gary,Ind. U5 ....4.30
Houston,Tex. S5 ....4.70
Ind.Harbor,Ind. I-2 Y1 4.30
Johnstown,Pa. B2 ....4.30
KansasCity,Mo. S5 ....4.90
Lackawanna,N.Y. B2 ....4.30
LosAngeles B3 ....5.35
Massillon,O. R2 ....4.30
Midland,Pa. C18 ....4.30
So.Duquesne,Pa. U5 ....4.30
Struthers,O. Y1 ....4.30
Warren,O. C17 ....4.30
Youngstown U5 ....4.30

BAR SHAPES Hot-Rolled Alloy
Clairton,Pa. U5 ....4.55
Gary,Ind. U5 ....4.55
Youngstown U5 ....4.55

BARS & SMALL SHAPES, H.R., High-Strength Low-Alloy
Aliquippa,Pa. J5 ....5.55
Bessemer,Ala. T2 ....5.55
Bethlehem,Pa. B2 ....5.55
Clairton,Pa. U5 ....5.55
Cleveland R2 ....5.55
Fairfield,Ala. T2 ....5.55
Fontana,Calif. K1 ....6.40
Gary,Ind. U5 ....5.55
Ind.Harbor,Ind. I-2 ....5.55
IndianaHarbor,Ind. Y1..6.05
Johnstown,Pa. B2 ....5.55
Lackawanna,N.Y. B2 ....5.55
LosAngeles B3 ....6.25
Pittsburgh J5 ....5.55
Seattle B3 ....6.30
So.Duquesne,Pa. U5 ....5.55
So.SanFrancisco B3 ....6.30
Struthers,O. Y1 ....6.05
Youngstown U5 ....5.55

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....4.55
BeaverFalls,Pa. M12,R2 4.55
Buffalo, B5 ....4.60
Camden,N.J. P13 ....5.00
Carnegie,Pa. C12 ....4.55
Chicago W18 ....4.55
Cleveland A7, C20 ....4.55
Detroit P17 ....4.70
Donora,Pa. A7 ....4.55
Elyria,O. W8 ....4.55
FranklinPark,Ill. N5 ....4.55
Gary,Ind. R2 ....4.55
GreenBay,Wis. F7 ....4.55
Hammond,Ind. L2, M13 4.55
Hartford,Conn. R2 ....5.10
Harvey,Ill. B5 ....4.55
Massillon,O. R2, R8 ....4.55
Monaca,Pa. S17 ....4.55
Newark,N.J. W18 ....5.00
Plymouth,Mich. P5 ....4.80
Pittsburgh J5 ....4.55
Putnam,Conn. W18 ....5.10
Readville,Mass. C14 ....5.10
St.Louis,Mo. M5 ....4.95
So.Chicago,Ill. W14 ....4.55
SpringCity,Pa.(5) K3 ..5.00
Struthers,O. Y1 ....4.55
Waukegan,Ill. A7 ....4.55
Youngstown F3, Y1 ....4.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....5.40
BeaverFalls,Pa. M12 ....5.40
Bethlehem,Pa. B2 ....5.40
Buffalo B5 ....5.40
Camden,N.J. P13 ....5.80
Canton,O. R2 ....5.40
Canton,O.(29) T7 ....4.90
Carnegie,Pa. C12 ....5.40
Chicago W18 ....5.40
Cleveland A7 ....5.40
Cleveland C20 ....5.40
Detroit P17 ....5.55
Donora,Pa. A7 ....5.45
Elyria,O. W8 ....5.40
Gary,Ind. R2 ....5.40
Hammond,Ind. L2, M13 5.40
Hartford,Conn. R2 ....5.85
Harvey,Ill. B5 ....5.40
Lackawanna,N.Y. B2 ....5.40
Mansfield,Mass. B5 ....5.85
Massillon,O. R2, R8 ....5.40
Midland,Pa. C18 ....5.40
Monaca,Pa. S17 ....5.40
Newark,N.J. W18 ....5.75
Plymouth,Mich. P5 ....5.60
So.Chicago,Ill. R2, W14 5.40
Struthers,O. Y1 ....5.40
Warren,O. C17 ....5.40
Waukegan,Ill. A7 ....5.45
Worcester,Mass. A7 ....5.75
Youngstown F3, Y1 ....5.40

RAIL STEEL BARS
ChicagoHts.(3,4) C2 ....4.75
ChicagoHts.(3,4) I-2 ....4.75
Franklin,Pa. (3,4) F5 ..4.75
FortWorth,Tex.(26) T4 .4.85
Huntngtn,W.Va.(3) WT..5.50
Marion,O.(3) P11 ....4.75
Moline,Ill.(3) R2 ....3.80
Tonawanda(3,4) B12 ....4.75
Williamsport(3) S19 ....5.00
Williamsport(4) S19 ....5.10

BARS, Wrought Iron
Dover,N.J.(Staybolt)U1 15.00
Dover,(Eng.Bolt) U1 ..13.50
Dover,(Wrgh.Iron) U1 12.25
Economy,Pa.(B.R.) B14 9.60
Economy,Pa.(D.R.)B14 11.90
Economy,(Staybolt)B14 12.20
McK.Rks.(Staybolt)L5 14.50
McK.Rks.(S.R.) L5 ....9.60
McK.Rks.(D.R.) L5 ..13.00

BARS, Reinforcing (Fabricators)
AlabamaCity,Ala. R2 ..3.70
Atlanta A11 ....4.25
Buffalo R2 ....3.70
Cleveland R2 ....3.70
Emeryville,Calif. J7 ....4.45
Fairfield,Ala. T2 ....3.70
Fontana,Calif. K1 ....4.40
Gary,Ind. U5 ....3.70
Houston,Tex. S5 ....4.10
Ind.Harbor,Ind. I-2 Y1..3.70
Johnstown,Pa. B2 ....3.70
KansasCity,Mo. S5 ....4.30
Lackawanna,N.Y. B2 ....3.70
LosAngeles B3 ....4.40
Milton,Pa. B6 ....4.55
Minnequa,Colo. C10 ....4.50
Niles,Calif. P1 ....5.05
Pittsburg,Calif. C11 ....4.40
Pittsburgh J5 ....3.70
Portland,Oreg. O4 ....4.65
Seattle B3, N14 ....4.45
So.Chicago,Ill. R2 ....3.70
So.Duquesne,Pa. U5 ....3.70
So.SanFrancisco B3 ....4.45
SparrowsPoint,Md. B2 ..3.70
Struthers,O. Y1 ....3.70
Torrance,Calif. C11 ....4.40
Youngstown R2, U5 ....3.70

BARS, Reinforcing
(Fabricated; to Consumers)
Huntington,W.Va. W7 ..5.50
Johnstown, ¼-1" B2 ....4.75
Los Angeles B3 ....5.45
Marion,O. P11 ....5.00
Seattle B3, N14 ....5.55
So.SanFrancisco B3 ....5.45
SparrowsPt. ¼-1" B2 ..4.75
Williamsport,Pa. S19 ..5.10

SHEETS, Hot-Rolled Steel
(18 gage and heavier)
AlabamaCity,Ala. R2 ..3.60
Ashland,Ky.(8) A10 ....3.60
Butler,Pa. A10 ....3.60
Cleveland J5, R2 ....3.60
Conshohocken,Pa. A3 ..4.00
Detroit, M1 ....4.40
Ecorse,Mich. (w) G5 ....3.80
Fairfield,Ala. T2 ....3.60
Fontana,Calif. K1 ....4.55
Gary,Ind. U5 ....3.60
Geneva,Utah C11 ....3.70
GraniteCity,Ill. G4 ....4.30
Ind.Harbor,Ind. I-2, Y1 3.60
Irvin,Pa. U5 ....3.60
Lackawanna,N.Y. B2 ....3.60
Munhall,Pa. U5 ....3.60
Niles,O. N12 ....5.25
Pittsburg,Calif. C11 ....4.30
Pittsburgh J5 ....3.60
Sharon,Pa. S3 ....4.00
So.Chicago,Ill. W14 ....3.60
SparrowsPoint,Md. B2 ..3.60
Steubenville,O. W10 ....3.60
Torrance,Calif. C11 ....4.30
Warren,O. R2 ....3.60
Weirton,W.Va. W6 ....3.60
WestLeechburg,Pa. A4 ..3.75
Youngstown U5, Y1 ....3.60

SHEETS, H.R. (19 gage)
AlabamaCity,Ala. R2 ..4.75
Dover,O. R1 ....6.65
Ind.Harbor,Ind. I-2 ....5.40
Mansfield,O. E6 ....5.85
Niles,O. N12 ....5.75
Torrance,Calif. C11 ....5.40

SHEETS, H.R. (14 ga., heavier)

High-Strength Low-Alloy
Cleveland J5, R2 ....5.40
Conshohocken,Pa. A3 ..5.65
Ecorse,Mich. G5 ....5.95
Fairfield,Ala. T2 ....5.40
Fontana,Calif. K1 ....6.35
Gary,Ind. U5 ....5.40
Ind.Harbor,Ind. I-2 ....5.40
Ind.Harbor,Ind. Y1 ....5.90
Irvin,Pa. U5 ....5.40
Lackawanna(35) B2 ....5.40
Pittsburgh J5 ....5.40
Sharon,Pa. S3 ....5.40
So.Chicago,Ill. U5 ....5.40
SparrowsPoint(36) B2..5.40
Warren,O. R2 ....5.40
Weirton,W.Va. W6 ....5.75
Youngstown U5 ....5.40
Youngstown Y1 ....5.90

SHEETS, Cold-Rolled
High-Strength Low-Alloy
Cleveland J5, R2 ....6.65
Ecorse,Mich. G5 ....7.10
Fontana,Calif. K1 ....7.05
Gary,Ind. U5 ....6.55
IndianaHarbor,Ind. Y1 7.05
IndianaHarbor,Ind. I-2..6.55
Irvin,Pa. U5 ....6.55
Lackawanna(37) B2 ....6.55
Pittsburgh J5 ....6.55
SparrowsPoint(38) B2..6.55
Warren,O. R2 ....6.55
Weirton,W.Va. W6 ....6.90
Youngstown Y1 ....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

Butler,Pa. A10	4.35
Cleveland J5, R2	4.35
Ecorse,Mich. G5	4.55
Fairfield,Ala. T2	4.35
Follansbee,W.Va. F4	5.35
Fontana,Calif. K1	5.30
Gary,Ind. U5	4.35
Granite City,Ill. G4	5.65
Ind Harbor,Ind. I-2, Y1	4.35
Irvin,Pa. U5	4.35
Lackawanna,N.Y. B2	4.35
Middletown,O. A10	4.35
Pittsburg,Calif. C11	5.30
Pittsburgh J5	4.35
SparrowsPoint,Md. B2	4.35
Steubenville,O. W10	4.35
Warren,O. R2	4.35
Weirton,W.Va. W6	4.35
Youngstown Y1	4.35

SHEETS, Gal'd No. 10 Steel

Alabama City,Ala. R2	4.80
Ashland,Ky.(8) A10	4.80
Canton,O. R2	4.80
Dover,O. B1	5.50
Fairfield,Ala. T2	4.80
Gary,Ind. U5	4.80
Granite City,Ill. G4	5.50
Ind Harbor,Ind. I-2	4.80
Irvin,Pa. U5	4.80
Kokomo,Ind.(13) C16	5.20
Martins Ferry,O. W10	4.80
Niles,O. N12	6.00
Pittsburg,Calif. C11	5.55
SparrowsPoint,Md. B2	4.80
Steubenville,O. W10	4.80
Torrance,Calif. C11	5.55
Weirton,W.Va. W6	4.80

SHEETS, Galvanized No. 10, High-Strength Low-Alloy

Irvin,Pa. U5	7.20
SparrowsPoint(39) B2	6.75

SHEETS, Galvannealed Steel

Canton,O. R2	5.35
Irvin,Pa. U5	5.35
Kokomo,Ind.(13) C16	5.75
Niles,O. N12	6.55

SHEETS, ZINCGRIP Steel No. 10

Butler,Pa. A10	5.05
Middletown,O. A10	5.05

SHEETS, Electro Galvanized

Cleveland R2 (28)	5.65
Niles,O. R2 (28)	5.65
Weirton,W.Va. W6	5.50

SHEETS, Zinc Alloy

Ind Harbor,Ind. I-2	5.70

SHEETS, Drum Body

Pittsburg,Calif. C11	4.30
Torrance,Calif. C11	4.30

SHEETS, Well Casing

Fontana,Calif. K1	5.10

BLUED Stock, 29 ga

Yorkville,O. W10	6.80
Follansbee,W.Va.(23) F4	6.85

SHEETS, Enameling Iron

Ashland,Ky.(8) A10	4.65
Cleveland R2	4.65
Gary,Ind. U5	4.65
Granite City,Ill. G4	5.35
Ind Harbor,Ind. I-2	4.65
Irvin,Pa. U5	4.65
Middletown,O. A10	4.65
Youngstown Y1	4.65

SHEETS, BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$6.25
Fairfield,Ala. T2	6.35
Gary,Ind. U5	6.25
Granite City,Ill. G4	6.45
Ind Harbor,Ind. I-2, Y1	6.25
Irvin,Pa. U5	6.25
Niles,O. R2	6.25
Pittsburg,Calif. C11	7.00
SparrowsPoint,Md. B2	6.35
Warren,O. R2	6.25
Weirton,W.Va. W6	6.25
Yorkville,O. W10	6.25

SHEETS, HOLLOWARE ENAMELING Black Plate (29 gage)

Follansbee,W.Va. F4	5.85
Gary,Ind. U5	5.85
Granite City,Ill. G4	6.05
Ind Harbor,Ind. Y1	5.30
Irvin,Pa. U5	5.85
Yorkville,O. W10	6.15

SHEETS, Culvert No. 16

	Cu Alloy	Cu Fe
Ashland,Ky. A10	5.60	
Canton,O. R2	5.65	6.10
Fairfield,Ala. T2	5.60	5.85
Gary,Ind. U5	5.60	5.85
IndianaHarbor I-2	5.60	5.85
Irvin,Pa. U5	5.60	5.85
Kokomo,Ind. C16	6.25	
Martinsb'g,O. W10	5.60	5.85
Pittsburg,Cal. C11	6.35	
SparrowsPt. B2	5.60	
Torrance,Cal. C11	6.35	

SHEETS, Culvert, No. 16 Pure Iron

Ashland,Ky. A10	5.85
Fairfield,Ala. T2	5.85

SHEETS, Hot-Rolled Ingot Iron 18 Gage and Heavier

Ashland,Ky.(8) A10	3.85
Cleveland R2	4.20
Ind Harbor,Ind. I-2	3.85
Warren,O. R2	4.20

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2	4.95
Middletown,O. A10	4.85
Warren,O. R2	4.95

SHEETS, Galvanized Ingot Iron No. 10 flat

Ashland,Ky.(8) A10	5.05
Canton,O. R2	5.50

SHEETS, ZINCGRIP Ingot Iron

Butler,Pa. A10	5.30
Middletown,O. A10	5.30

SHEETS, ALUMINIZED

Butler,Pa. A10	8.15

TIN PLATE, Electrolytic (Base Box)

	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.15	$7.40	$7.80
Fairfield,Ala. T2	7.25	7.50	7.90
Gary,Ind. U5	7.15	7.40	7.80
Granite City,Ill. G4	7.35	7.60	8.00
Ind Harbor,Ind. I-2, Y1	7.15	7.40	7.80
Irvin,Pa. U5	7.15	7.40	7.80
Niles,O. R2	7.15	7.40	7.80
Pittsburg,Calif. C11	7.90	8.15	8.55
SparrowsPoint,Md. B2	7.25	7.50	7.90
Weirton,W.Va. W6	7.15	7.40	7.80
Yorkville,O. W10	7.15	7.40	7.80

SHEETS, SILICON, H R or C R (22 Ga.) COILS (Cut Lengths 1/2c lower)

	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W10 (cut lengths)	...	...	7.25	8.50	9.30
Brackenridge,Pa. A4	...	...	7.75	9.00	9.80
GraniteCity,Ill.G4 (cut lengths)	...	...	7.95	9.20	...
Ind Harbor,Ind. I-2	6.95	7.25	(34)	...	...
Mansfield,O. E6 (cut lengths)	7.10	7.25	7.75	9.00	9.80
Niles,O. N12 (cut lengths)	...	6.75	7.25	...	...
Vandergrift,Pa. U5	...	7.25	7.75	9.00	9.80
Warren,O. R2	6.95	7.25	7.75	9.00	9.80
Zanesville,O. A10	...	7.25	7.75	9.00	9.80

SHEETS, SILICON (22 Ga. Base) Coils (Cut Lengths 1/2c lower) Transformer Grade

	72	65	58	52
Beechbottom,W10 (cut lengths)	9.85	10.40	11.10	11.90
Brackenridge,Pa. A4	10.35	...	...	...
Vandergrift,Pa. U5	10.35	10.90	11.60	12.40
Warren,O. R2	10.35	...	...	...
Zanesville,O. A10	10.35	10.90	11.60	12.40

H R or C R COILS AND CUT LENGTHS, SILICON (22 Ga.)

	T-100	T-90	T-80	T-73
Butler,Pa. A10 (C R)	...	...	14.75	15.25
Vandergrift,Pa. U5	12.90	13.75	14.75	15.25

TINPLATE, American Coke (Base Box)

	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$8.45	$8.70
Fairfield,Ala. T2	8.55	8.80
Gary,Ind. U5	8.45	8.70
Ind Har. I-2, Y1	8.45	8.70
Irvin,Pa. U5	8.45	8.70
Pitts.,Cal. C11	9.20	9.45
Sp Pt,Md. B2	8.55	8.80
Warren,O. R2	8.45	8.70
Weirton,W.Va. W6	8.45	8.70
Yorkville,O. W10	8.45	8.70

MANUFACTURING TERNES (Special Coated)

Fairfield,Ala. T2	$7.60
Gary,Ind. U5	7.50
Irvin,Pa. U5	7.50
SparrowsPoint,Md. B2	7.60
Yorkville,O. W10	7.50

SHEETS, LT. Coated Ternes, 6 lb

Yorkville,O. W10	$8.40

SHEET, Mfg. Ternes, 8 lb (Commercial Quality)

Gary,Ind. U5	$9.50
Yorkville,O. W10	9.50

SHEET, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va.W10	5.20
Gary,Ind. U5	5.20
Mansfield,O. E6	6.05
Middletown,O. A10	5.20
Niles,O. N12	6.00
Weirton,W.Va. W6	5.20

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10	5.60

ROOFING SHORT TERNES (8 lb Coated)

Gary,Ind. U5	9.50

STRIP, Hot-Rolled High-Strength Low-Alloy

Bessemer, Ala. T2	5.30
Conshohocken,Pa. A3	5.55
Ecorse,Mich. G5	5.95
Fairfield,Ala. T2	5.30
Fontana,Calif. K1	6.20
Gary,Ind. U5	5.30
Ind Harb.,Ind. I-2	5.30
IndianaHarbor,Ind. Y1	5.80
Lackawanna,N.Y. B2	4.95
LosAngeles(25) B3	6.05
Seattle B3	6.30
Sharon,Pa. S3	5.40
So SanFrancisco(25) B3	6.05
SparrowsPoint,Md. B2	4.95
Warren,O. R2	5.30
Weirton,W.Va. W6	5.75
Youngstown Y1	5.80
Youngstown U5	5.30

STRIP, Cold-Rolled High-Strength Low-Alloy

Cleveland J5	6.70
Cleveland A7	6.55
Dover,O. G6	7.30
Fontana,Calif. K1	6.95
Lackawanna,N.Y. B2	6.55
Sharon,Pa. S3	6.55
SparrowsPoint,Md. B2	6.40
Warren,O. R2	6.55
Weirton,W.Va. W6	7.20
Youngstown Y1	7.05

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	3.50
Alton,Ill. L1	3.95
Ashland,Ky.(8) A10	3.50
Atlanta A11	4.05
Bessemer,Ala. T2	3.50
Bridgeprt,Conn.(10) S15	4.90
Buffalo(27) R2	3.50
Butler,Pa. A10	3.50
Carnegie,Pa. S18	4.00
Conshohocken,Pa. A3	3.90
Detroit M1	4.40
Ecorse,Mich. G5	3.80
Fairfield,Ala. T2	3.50
Fontana,Calif. K1	4.75
Gary,Ind. U5	3.50
Houston,Tex. S5	4.90
Ind Harbor,Ind. I-2, Y1	3.50
Johnstown,Pa.(25) B2	3.50
KansasCity,Mo.(19) S5	4.10
Lackawanna,N.Y.(32) B2	3.50
LosAngeles B3	4.25
Milton,Pa. B6	4.35
Minnequa,Colo. C10	4.55
New Britain(10) S15	4.00
No.Tonawanda,N.Y. B11	3.50
Pittsburg,Calif. C11	4.25
Riverdale,Ill. A1	3.50
SanFrancisco S7	4.85
Seattle B3, N14	4.50
Sharon,Pa. S3	4.00
So.Chicago,Ill. W14	3.50
So.SanFrancisco B3	4.25
SparrowsPoint,Md. B2	3.50
Torrance,Calif. C11	4.25
Warren,O. R2	3.50
Weirton,W.Va. W6	3.60
WestLeechburg,Pa. A4	3.75
Youngstown U5, Y1	3.50

STRIP, Hot-Rolled Alloy

Bridgeprt,Conn.(10) S15	5.45
Carnegie,Pa. S18	5.85
Fontana,Calif. K1	6.70
Gary,Ind. U5	5.50
Houston,Tex. S5	5.90
KansasCity,Mo. S5	6.10
Midland,Pa. C18	5.85
NewBritn,Conn.(10) S15	5.45
Sharon,Pa. S3	5.85
Youngstown U5	5.50

STRIP, Cold-Rolled Carbon

Anderson,Ind.(40) G6	5.50
Berea,O. C7	6.60
Bridgeprt,Conn.(10) S15	5.35
Butler,Pa. A10	4.65
Cleveland A7, J5	4.65
Dearborn,Mich. D3	5.60
Detroit D2	5.60
Detroit M1	5.45
Dover,O.(40) G6	5.50
Ecorse,Mich. G5	4.85
Follansbee,W.Va. F4	5.35
Fontana,Calif. K1	6.30
FranklinPark,Ill.(40) T6	4.90
Ind.Harbor,Ind. I-2	4.90
Lackawanna,N.Y. B2	4.65
LosAngeles C1	6.40
Mattapan,Mass. T6	5.50
Middletown,O. A10	4.65
NewBritain(10) S15	5.35
NewCastle,Pa. B4	5.35
NewCastle,Pa.(40) E5	5.25
NewHaven,Conn. D2	5.85
NewHaven,Conn. A7	5.15
Pawtucket,R.I. R3	6.00
Pawtucket,R.I.(2) NS	5.85
Riverdale,Ill.(40) A1	4.90
Rome,N.Y. R6	5.10
Sharon,Pa. S3	5.35
SparrowsPoint,Md. B2	4.65
Trenton,N.J. R5	6.00
Wallingford,Conn. W2	5.85
Warren,O.(40) T5	5.25
Warren,O. R2	4.65
Weirton,W.Va. W6	4.65
Youngstown C8 (40)	5.25
Youngstown Y1	4.65

STRIP, Electro Galvanized

Dover,O. G6	5.50
Warren,O. T5	5.25
Weirton,W.Va. W6	4.65
Youngstown C8	5.25

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Berea,O. C7	...	6.80	7.40	9.35	11.65
Bridgeport,Conn.(10) S15	5.35	6.80	7.40	9.35	11.65
Bristol,Conn. W1	...	...	7.70	9.65	...
Carnegie,Pa. S18	...	6.80	7.40	9.35	11.65
Cleveland A7	4.65	6.45	7.40	9.35	11.65
Dearborn,Mich. D3	5.60	7.05	7.65	...	...
Detroit D2	5.60	6.65	7.25	...	...
Dover,O. G6	5.50	6.80	7.40	9.35	11.65
FranklinPark,Ill. T6	5.00	6.60	7.35	9.50	11.80
Harrison,N.J. C18	...	...	7.70	9.65	11.95
Mattapan,Mass. T6	5.50	6.75	7.70	9.65	11.95
NewBritn.,Conn.(10) S15	5.35	6.80	7.40	9.35	11.65
NewCastle,Pa. B4	5.35	6.80	7.40	9.35	...
NewCastle,Pa. E5	5.50	6.80	7.40	9.35	11.65
NewHaven,Conn. D2	5.85	6.75	7.35	...	...
NewYork W3	...	7.10	7.70	9.65	11.95
Pawtucket,R.I. NS: Cleve.orPitts.Base	...	6.80	7.40	9.35	11.65
Worcester,Mass. Base	5.85	7.10	7.70	9.65	11.95
Sharon,Pa. S3	5.35	6.80	7.40	9.35	11.65
Trenton,N.J. R5	...	7.10	7.70	9.65	11.95
Wallingford,Conn. W2	5.85	6.75	7.35	9.30	11.60
Weirton,W.Va. W6	5.35	6.80	7.40	9.35	11.65
Worcester,Mass. A7	4.95	6.75	7.70	9.65	11.95
Worcester,Mass. T6	5.50	6.75	7.70	9.65	11.95
Youngstown C8	...	6.80	7.40	9.35	11.65
Spring Steel (Tempered)					
Trenton,N.J. R5	...	...	10.30	12.50	15.35
Harrison,N.J. C18	...	...	10.30	12.50	15.35
NewYork W3	...	...	10.30	12.50	15.35

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A13 American Cladmetals Co.

B1 Babcock & Wilcox Co.
B2 †Bethlehem Steel Co.
B3 Beth. Pac Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B6 Bonard Steel Corp.
B9 Braeburn Alloy Steel
B11 Buffalo Bolt Co.
B12 Buffalo Steel Co.
B14 A. M. Byers Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Corp.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Sons, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.

E1 Eastern Gas & Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Steel
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
G2 Globe Iron Co.
G3 Globe Steel Tubes Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
H1 Hanna Furnace Corp.
I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div. Borg-Warner Corp.
J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.
K1 Kaiser Steel Corp.
K2 Keokuk Electro Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Electric Steel
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

STRIP, Cold-Rolled Alloy Steel

Bridgeport,Conn.(19)	$15 10.75
Carnegie,Pa.	S18 10.60
Cleveland A7	10.00
Dover,O. G6	10.50
Fontana,Calif. K1	11.65
Harrison,N.J. C18	10.60
Midland,Pa. C18	10.60
NewBritn,Conn.(10)	S15 10.75
Pawtucket,R.I.(11)	N8 10.75
Pawtucket,R.I.(12)	N8 11.05
Sharon,Pa. S3	10.60
Worcester,Mass. A7	10.30
Youngstown C8	10.60

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	3.75
Warren,O. R2	4.10

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	5.25

TIGHT COOPERAGE HOOP

Atlanta A11	4.05
Riverdale,Ill. A1	3.90
Sharon,Pa. S3	4.15
Youngstown U5	3.75

WIRE, Tire Bead

Bartonville,Ill.(1) K4	10.90
Monessen,Pa. P16	11.40
Roebling,N.J. R5	11.35

Wire, Merchant Quality

(6 to 8 gage)	An'ld	Galv.
AlabamaCity R2	5.70	5.95
Aliquippa J5	5.70	6.15
Atlanta A11	5.90	6.40
Bartonville(19)K4	5.70	6.15
Buffalo W12	4.85	
Cleveland A7	5.70	6.15
Crawfordsville M8	5.95	6.40
Donora,Pa. A7	5.70	6.15
Duluth,Minn. A7	5.70	6.15
Fairfield T2	5.70	6.15
Houston,Tex. S5	6.10	6.55
Johnstown B2	5.70	6.15
Joliet,Ill. A7	5.70	6.15
KansasCy,Mo. S5	6.30	6.75
Kokomo C16	5.80	6.05
LosAngeles B3	6.65	
Minnequa C10	5.95	6.45
Monessen P7	5.95	6.40
Palmer W12	5.65	
Pitts. Calif. C11	5.65	6.80
Prtsmth.(18)P12	6.10	6.60
Rankin A7	5.70	6.15
So.Chicago R2	5.70	5.95
So.S.Fran. C10	6.65	7.10
SparrowsPt. B2	5.80	6.25
Sterling,Ill.(1)N15	5.70	6.15
Struthers,O. Y1	5.70	6.15
Torrance,Cal. C11	6.65	
Worcester A7	6.00	6.45

ROPE WIRE

	(A)	(B)
Alton,Ill. L1	8.65	8.90
Bartonville,Ill. K4	8.55	8.80
Buffalo W12	8.55	8.80
Fostoria,O. S1	8.85	9.10
Johnstown,Pa. B2	8.55	8.80
Monessen,Pa. P16	8.55	8.80
Monessen,Pa. P7	8.80	9.05
Palmer,Mass. W12	8.55	9.10
Portsmouth,O. P12	8.55	8.80
Roebling,N.J. R5	8.85	9.10
SparrowsPt. B2	8.65	8.90
Struthers,O. Y1	8.55	8.80
Worcester J4, T6	8.85	9.10

(A) Plow and Mild Plow
(B) Improved Plow.

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	4.85
Aliquippa,Pa. J5	4.85
Atlanta A11	5.10
Alton,Ill. L1	5.05
Bartonville,Ill.(1) K4	4.85
Buffalo W12	4.85
Chicago W13	5.10
Cleveland A7, C20	4.85
Crawfordsville,Ind. M8	5.10
Donora,Pa. A7	4.85
Duluth,Minn. A7	4.85
Fairfield,Ala. T2	4.85
Fostoria,O.(24) S1	5.35
Houston S5	5.25
Johnstown,Pa. B2	4.85
Joliet,Ill. A7	4.85
KansasCity,Mo. S5	5.45
Kokomo,Ind. C16	4.95
LosAngeles B3	5.80
Minnequa,Colo. C10	5.10
Monessen,Pa. P7	5.10
Newark, 6-8 ga. I-1	5.50
No.Tonawanda B11	4.85
Palmer,Mass. W12	5.15
Pittsburg,Calif. C11	5.80
Portsmouth,O. P12	5.25
Rankin,Pa. A7	4.85
So.Chicago,Ill. R2	4.85
So.SanFrancisco C10	5.80
SparrowsPoint,Md. B2	4.95
Sterling,Ill.(1) N15	4.85
Struthers,O. Y1	4.85
Torrance,Calif. C11	5.80
Waukegan,Ill. A7	4.85
Worcester,Mass. A7, T6	5.15

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	6.20
Buffalo W12	6.35
Cleveland A7	5.85
Crawfordsville,Ind. M8	6.20
Detroit D2	6.20
Dover,O. G6	6.20
Fostoria,O. S1	6.00
Kokomo,Ind. C16	5.70
FranklinPark,Ill. T6	6.20
Massillon,O. R8	5.85
Monessen,Pa. P16	5.85
Monessen,Pa. P7	6.10
NewHaven,Conn. D2	6.50
Pawtucket,R.I.(12) N8	6.85
Trenton,N.J. R3	6.15
Worcester,Mass. A7	6.15
Worcester,Mass. T6	6.50
Worcester,Mass. W12	6.65

WIRE, Galv'd ACSR for Cores

Bartonville,Ill. K4	8.50
Monessen,Pa. P16	8.50
Roebling,N.J. R5	8.80
SparrowsPoint,Md. B2	8.60
Johnstown,Pa. B2	8.50

WIRE (16 gage)	An'ld Stone	Galv. Stone
Aliquippa J5	10.15	12.15
Bartonville(1)K4	10.25	11.95
Cleveland A7	10.25	12.15
Crawfrdsville M8	10.30	12.00
Fostoria,O. S1	10.40	13.00
Johnstown B2	10.25	12.15
Kokomo C16	10.25	11.95
Minnequa C10	10.40	12.40
Palmer,Mass.W12	10.25	12.15
Pitts.Cal. C11	10.60	12.50
Prtsmth.(18) P12	10.55	12.30
SparrowsPt. B2	10.35	12.25
Waukegan A7	10.25	12.15

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	6.25
Alton,Ill. L1	6.45
Bartonville,Ill.(1) K4	6.25
Buffalo W12	6.25
Cleveland A7	6.25
Donora,Pa. A7	6.25
Duluth,Minn. A7	6.25
Fostoria,O. S1	6.25
Johnstown,Pa. B2	6.25
LosAngeles B3	7.20
Milbury,Mass.(12) N6	8.05
Monessen,Pa. P7, P16	6.25
Palmer,Mass. W12	6.55
Pittsburg,Calif. C11	7.20
Roebling,N.J. R5	6.55
Portsmouth,O. P12	6.25
So.Chicago,Ill. R2	6.25
So.SanFrancisco C10	7.20
SparrowsPoint,Md. B2	6.35
Struthers,O. Y1	6.25
Trenton,N.J. A7	6.55
Waukegan,Ill. A7	6.25
Worcester,Mass. A7, T6, W12	6.55
Worcester,Mass. J4	6.75

WIRE, Fine & Weaving (8" Coils)

Bartonville,Ill.(1) K4	8.90
Buffalo W12	8.90
Chicago W13	8.90
Cleveland A7	8.90
Crawfordsville,Ind. M8	8.95
Fostoria,O. S1	8.90
Johnstown,Pa. B2	8.90
Kokomo,Ind. C16	8.90
Monessen,Pa. P16	8.90
Palmer,Mass. W12	9.20
Portsmouth,O. P12	8.95
Roebling,N.J. R5	9.20
Waukegan,Ill. A7	8.90
Worcester,Mass. A7, T6	9.20

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	137
Aliquippa,Pa. J5	141
Atlanta A11	144
Bartonville,Ill.(19) K4	144
Crawfordsville,Ind. M8	146
Donora,Pa. A7	141
Duluth,Minn. A7	141
Fairfield,Ala. T2	141
Houston,Tex. S5	149
Johnstown,Pa. B2	141
Joliet,Ill. A7	141
KansasCity,Mo. S5	153
Kokomo,Ind. C16	143
Minnequa,Colo. C10	147
Monessen,Pa. P7	146
Pittsburg,Calif. C11	161
Portsmouth,O.(18) P12	148
Rankin,Pa. A7	141
So.Chicago,Ill. R2	137
So.SanFran.,Calif. C10	161
SparrowsPoint,Md. B2	143
Sterling,Ill.(1) N15	141

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	123
Atlanta A11	126
Bartonville,Ill.(19) K4	123
Crawfordsville,Ind. M8	132
Donora,Pa. A7	123
Duluth,Minn. A7	123
Fairfield,Ala. T2	123
Joliet,Ill. A7	123
KansasCity,Mo. S5	135
Kokomo,Ind. C16	125
Minnequa,Colo. C10	128
Pittsburg,Calif. C11	147
So.Chicago,Ill. R2	123
So.SanFran.,Calif. C10	147
SparrowsPoint,Md. B2	125
Sterling,Ill.(1) N15	123

WIRE, Upholstery Spring

Aliquippa,Pa. J5	5.90
Alton,Ill. L1	6.10
Buffalo W12	5.90
Cleveland A7	5.90
Donora,Pa. A7	5.90
Duluth,Minn. A7	5.90
Johnstown,Pa. B2	5.90
LosAngeles B3	6.85
Monessen,Pa. P7, P16	5.90
NewHaven,Conn. A7	6.20
Palmer,Mass. W12	6.20
Pittsburg,Calif. C11	6.85
Portsmouth,O. P12	5.90
Roebling,N.J. R5	6.20
So.Chicago,Ill. R2	5.90
So.SanFrancisco C10	6.85
SparrowsPoint,Md. B2	6.00
Torrance,Calif. C11	6.85
Trenton,N.J. A7	6.20
Waukegan,Ill. A7	5.90
Worcester,Mass. A7	6.20

WOVEN FENCE, 9-15½Ga.

	Col.
AlabamaCity,Ala. R2	127
Ala.City,Ala.,17-18ga. R2	214
Aliquippa,Pa.9-14½ga. J5	131
Atlanta A11	134
Bartonville,Ill.(19) K4	131
Crawfordsville,Ind. M8	133
Donora,Pa. A7	131
Duluth,Minn. A7	131
Fairfield,Ala. T2	131
Houston,Tex. S5	139
Johnstown,Pa. B2	131
Johnstown,17ga.,6" B2	205
Johnstown,17ga.,4" B2	208
Joliet,Ill. A7	131
KansasCity,Mo. S5	142
Kokomo,Ind. C16	133
Minnequa,Colo. C10	139
Monessen,Pa. P7	136
Pittsburg,Calif. C11	154
Portsmouth,O.(18) P12	138
Rankin,Pa. A7	131
So.Chicago,Ill. R2	127
Sterling,Ill.(1) N15	131

FENCE POSTS

ChicagoHts.,Ill. C2	140
Duluth,Minn. A7	125
Franklin,Pa. F5	140
Huntington,W.Va. W7	140
Johnstown,Pa. B2	140
Marion,O. P11	140
Minnequa,Colo. C10	130
Moline,Ill. R2	138
So.Chicago,Ill. R2	140
Tonawanda,N.Y. B12	140
Williamsport,Pa. S19	150

TRACK BOLTS (20) Treated

KansasCity,Mo. S5	9.85
Lebanon,Pa.(31) B2	9.85
Minnequa,Colo. C10	9.85
Pittsburgh O3, P14	9.85
Seattle B3	10.35

RAILS

	Std. No. 1	Std. No. 2	Std. All No. 2	Tee Rails 60 lb. Under
Bessemer,Pa. U5	3.60	3.50	3.55	4.00
Ensley,Ala. T2	3.60	3.50		4.00
Fairfield,Ala. T2				4.00
Gary,Ind. U5	3.60	3.50	3.55	
Huntington,W.Va. W7				5.00
Ind.Harbor,Ind. I-2	3.60	3.50	3.55	
Johnstown,Pa. B2				(16)4.00
Lackawanna,N.Y. B2	3.60	3.50		4.00
Minnequa,Colo. C10	3.60	3.50		4.50
Steelton,Pa. B2	3.60	3.50		
Williamsport,Pa. S19				4.75

NAILS & STAPLES, Stock

To dealers & mfrs. (7)	Col.
AlabamaCity,Ala. R2	118
Aliquippa,Pa.(13) J5	118
Atlanta A11	121
Bartonville,Ill.(19) K4	118
Chicago,Ill. W13	118
Cleveland A9	125
Crawfordsville,Ind. M8	122
Donora,Pa. A7	118
Duluth,Minn. A7	118
Fairfield,Ala. T2	118
Galveston,Tex. D7	124
Houston,Tex. S5	124
Johnstown,Pa. B2	118
Joliet,Ill. A7	118
KansasCity,Mo. S5	130
Kokomo,Ind. C16	120
Minnequa,Colo. C10	123
Monessen,Pa. P7	124
Pittsburg,Calif. C11	137
Portsmouth,O. P12	124
Rankin,Pa. A7	118
So.Chicago,Ill. R2	118
SparrowsPoint,Md. B2	120
Sterling,Ill.(1) N15	118
Torrance,Calif. C11	138
Worcester,Mass. A7	124

NAILS, Cut (100 lb keg)

To dealers (33)	
Conshohocken,Pa. A3	$7.35
Wheeling,W.Va. 10	7.35

TIE PLATES

Fairfield,Ala. T2	4.50
Gary,Ind. U5	4.50
Ind.Harbor,Ind. I-2	4.50
Lackawanna,N.Y. B2	4.50
Minnequa,Colo. C10	4.50
Pittsburg,Calif. C11	4.65
Seattle B3	4.65
Steelton,Pa. B2	4.50
Torrance,Calif. C11	4.65

JOINT BARS

Bessemer,Pa. U5	4.70
Fairfield,Ala. T2	4.70
Ind.Harbor,Ind. I-2	4.70
Joliet,Ill. U5	4.70
Lackawanna,N.Y. B2	4.70
Minnequa,Colo. C10	4.70
Steelton,Pa. B2	4.70

STANDARD TRACK SPIKES

Ind.Harbor,Ind. I-2, Y1	6.15
KansasCity,Mo. S5	6.40
Lebanon,Pa. B2	6.15
Minnequa,Colo. C10	6.15
Pittsburgh J5	6.15
Seattle B3	6.65
So.Chicago,Ill. R2	6.15
Struthers,O., Y1	6.15
Youngstown R2	6.15

AXLES

Ind.Harbor,Ind. R13	5.60
Johnstown,Pa. B2	5.60

Key to Producers

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Tube & Mfg. Co.
M8 Mid-States Steel & Wire
M9 Midvale Co.
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M14 McInnes Steel Co.
N2 National Supply Co.
N3 National Tube Div.
N5 Nelsen Steel & Wire Co.
N6 NewEng-HighCarb.Wire
N8 Newman-Crosby Steel
N12 Niles Rolling Mill Div.
N14 Nrthwst. Steel Roll. Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.
O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills
P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P9 Pittsburgh Tube Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R8 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RelianceDiv.,EatonMfg.
S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S5 Sheffield Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S9 Sloss-Sheffield S.&I. Co.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S16 Struthers Iron & Steel
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
T2 Tenn. Coal & Iron Div.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.
U1 Ulster Iron Works.
U4 Universal Cyclops Steel
U5 United States Steel Co.
V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.
W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 West.Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div. International Harvester
W15 Woodward Iron Co.
W16 Wyckoff Steel Co.
Y1 YoungstownSheet&Tube

TOOL STEEL

Grade	$ per lb
Regular Carbon	0.230
Extra Carbon	0.270
Special Carbon	0.325
Oil Hardening	0.350
5% Cr Hot Work	0.350
Hi-Carbon-Cr	0.635

Grade by Analysis

W	Cr	V	Co	
18	4	1		1.505
18	4	2		1.650
20	25	4	25	1.6 12.25 3.535-3.675
19	4	2	7	2.460
18	25	4	25	4.75 2.125
18	4	2	9	2.445-2.45
13.5	4	3		1.6025

W	Cr	V	Mo	
6.4	4.5	1.9	5	0.96-0.965
6	4	3	6	1.190
1.5	4	1	8.5	0.810

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, L3, M14, S8, U4, V2 and V3.

Footnotes:
(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) Philadelphia del.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cnts. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass. base.
(13) Add 0.50c for 17 Ga. & heavier.
(14) Also wide flange beams.
(15) ¼" and thinner.
(16) 40 lb and under.
(17) Flats only.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25c off for untreated.
(21) New Haven, Conn., base.
(22) Del. San Francisco Bay area.
(23) 28 Ga. 36" wide.
(24) Deduct 0.20c, finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing, mill lengths, to fabricators; to customers, 5.60c.
(27) Bar mill sizes.
(28) Reinforced.
(29) Subject to 10-4% increase.
(30) Sheared; add 0.35c for universal mill.
(31) Not annealed.
(32) Rd. or square edge.
(33) To jobbers, deduct 20c
(34) 7.25c for cut lengths.
(35) 12" and narrower.
(36) 24" and narrower.
(37) 15 gage & lighter; 60" & narrower.
(38) 14 gage & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier 0.25c higher.

Check Why DOLLAR for DOLLAR You Get More with

MAGNAFLUX Equipment

for MAGNETIC PARTICLE INSPECTION

When you buy equipment for magnetic particle inspection, you are paying to get certain definite results . . . positive detection and identification of defects that will affect the fabrication or service of your part or product. You want inspection at the lowest possible cost per piece, *that saves you far more than it costs,* with intelligent aid for process control.

To be sure of getting these results more users choose Magnaflux equipment and methods, for more inspection operations than all other methods combined. That's a remarkable record—and well worth remembering when you consider buying any kind of inspection equipment.

Magnaflux not only pioneered magnetic particle inspection, it has continuously built refinements and improvements into Magnaflux Units to make inspection faster, simpler and surer. With Magnaflux, your operators and supervisory personnel receive complete initial training from Magnaflux engineers, and periodic schooling for as long as you own and use the Magnaflux equipment. The complete knowledge and engineering and research advice of Magnaflux Corporation are at your disposal *always.*

Your inspection dollars buy more—in value, performance and security—when you select "Inspection with Magnaflux."

VARIETY OF "WIDE USE" UNITS

Above unit is one of many types taking any part up to 54" long for efficient inspection. Similar units to 96" or 144", or 192", as required. Both A. C. and D. C. magnetizing currents available, and many convenience, speed, and special purpose accessories. Illustrated unit has Magnaglo hood and black lights, to give highest speed inspection of most reliability on irregular shapes. COST: Portable units from $485, fixed "wet" type units from $2190.

Just a few of the advantage features available in MAGNAFLUX EQUIPMENT

MAGNAGLO accessories are available for all Magnaflux units, to furnish fluorescent indications with maximum visibility at maximum speed. Gives lowest cost inspection per piece.

Proven magnetizing power circuit control insures positive, uniform detection results. Magnaflux inspection is never erratic, hit-or-miss.

30 point demagnetization system can be right in the unit—eliminates need for separate, time consuming demagnetization operation.

Switch controlled, air operated headstock for faster positioning and clamping of parts. Effortless, gear adjusted tail stock. More efficient agitation system to insure uniformity of the bath—essential to proper inspection.

Raised heads and coils can handle disc shaped parts up to 36" in diameter, or larger with fixtures available.

MAGNAFLUX CORPORATION

DETECTS DEFECTS

MAGNAFLUX CORPORATION

5912 Northwest Highway
Chicago 31, Illinois

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Export Distributor: Curtis Wright Corp
In Canada: Williams & Wilson, Ltd.

STANDARD PIPE, T & C

BUTTWELD

Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Black A	Black B	Black C	Galvanized D	Galvanized E	Galvanized F
⅛	5.5c	0.24	34.0	32.0	...	+ 0.5	+ 2.5	...
¼	6.0	0.42	28.5	26.5	...	+ 3.5	+ 5.5	...
⅜	6.0	0.57	23.5	21.5	...	+ 10.0	+ 12.0	...
½	8.5	0.85	36.0	34.0	35.0	12.0	10.0	11.0
¾	11.5	1.18	39.0	37.0	38.0	18.0	14.0	15.0
1	17.0	1.68	41.5	39.5	40.5	19.5	17.5	18.5
1¼	23.0	2.28	42.0	40.0	41.0	20.5	18.5	19.5
1½	27.5	2.78	42.5	40.5	41.5	21.5	19.5	20.5
2	37	3.68	43.0	41.0	42.0	22.0	20.0	21.0
2½	58.5	5.82	43.5	41.5	42.5	23.0	21.0	22.0
3	78.5	7.62	43.5	41.5	42.5	23.0	21.0	22.0

Column A: Etna, Pa. N2 and 36⅛ % on 3½", 4"; Butler, Pa. ¼-⅜", F6; Benwood, W. Va., 3½ points lower on ½", 1½ points lower on ¾", and 2 points lower on ⅝", W10; Sharon, Pa. M6, 1 point higher on ¼", 2 points lower on ⅜" and ⅝". Wheatland, Pa. W9, 2 points lower on ⅛", ¼", ⅜". Following make ½" and larger: Lorain, O., N3; Youngstown R2 and 36¼ % on 3½" and 4"; Youngstown Y1; Aliquippa, Pa. J5; Fontana, Calif. K1 quotes 11½ points lower on ½" and larger continuous weld and 24% on 3½" and 4".

Columns B & E: Sparrows Point, Md. B2.

Columns C & F: Indiana Harbor, Ind., Y1; Alton, Ill., (Gary base) 2 points lower discount L1.

Column D: Butler, Pa. F6, ¼-⅜"; Benwood, W. Va. W10, except plus 4% on ¼", plus 6% on ⅜", plus 13% on ½" and 15.5% on 3½", 4"; Sharon, Pa. M6, plus 2.5 on ⅛", 1 point lower on ½", ¾", 1¼ points lower on 1" and 1¼", 2 points lower on 1½", 2" 2½" and 3"; Wheatland, Pa. W9, add 2 points on ¼", ⅜", ½", 1 point lower on ¾", 2 points lower on 1", 1¼", 2", 1½ points lower on 1¼", 2½", 3". Etna, Pa. N2 and 15.5% on 3½", 4". Following quote only on ½" and larger: Lorain, O. N3; Youngstown R2, and 15½ % on 3½" and 4"; Youngstown Y1, Aliquippa, Pa. J5 quotes 1 point lower on ½", 2 points lower on 1", 1½", 2", 1½ points lower on 1¼", 2½" and 3".

SEAMLESS AND ELECTRIC WELD

Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Seamless Black A	Seamless Galv. B	Elec. Weld Black C	Elec. Weld Galv. D
2	37.0c	3.68	29.5	8.0	29.5	8.0
2½	58.5	5.82	32.5	11.5	32.5	11.5
3	76.5	7.62	32.5	11.5	32.5	11.5
3½	92.0	9.20	34.5	13.5	34.5	13.5
4	$1.09	10.89	34.5	13.5	34.5	13.5
5	1.48	14.81	37.0	16.0	37.0	16.0
6	1.92	19.18	37.0	16.0	37.0	16.0

Column A: Aliquippa J5; Ambridge N2; Lorain N3; Youngstown Y1.

Column B: Aliquippa J5 quotes 1½ pts lower on 2", 1 pt lower on 2½-6 in.; Lorain N3; Youngstown Y1.

Columns C & D: Youngstown R2.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft. mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
1	13	13.45	16.47	13.36	15.36
1¼	13	16.09	19.71	15.61	18.19
1½	13	17.27	21.15	17.25	20.30
1¾	13	19.29	23.62	19.62	23.09
2	13	21.62	26.48	21.99	25.86
2¼	13	24.35	29.82	24.50	28.84
2½	12	26.92	32.97	26.98	31.76
2¾	12	29.65	36.32	29.57	34.76
2¾	12	32.11	39.33	31.33	36.84
3	12	34.00	41.64	32.89	38.70

CLAD STEELS

(Cents per pound)

Cladding	Plates 10%	Plates 20%	Strip Cold-Rolled Carbon Base Both Sides	Sheets Carbon Base 10%	Sheets Carbon Base 20%	Sheets Cu Base Both Sides
Stainless						
302	...	...	...	19.75	26.24-27.50	77.00
304	25.00	29.50	...	24.50	27.50-27.77	77.00
309	30.50	35.00	...	...	...	...
310	36.50	41.00	...	...	...	144.00
316	29.50	34.00	...	26.00	35.92-36.50	...
317	34.50	39.00	...	...	...	...
318	33.50	38.00	...	...	...	...
321	26.50	31.00-32.00	...	23.00	33.00	111.00
347	27.50	32.00	...	24.00	33.50-33.83	130.00
405	21.25	27.75	...	...	...	...
410	20.75	27.25	...	...	...	...
Nickel	33.55	45.15	41.00	54.00	...	...
Inconel	41.23	54.18	...	...	...	165.00
Monel	34.93	46.28	...	...	...	...
Copper*	...	...	23.70†	29.65‡	...	...

* Deoxidized. † 20.20c for hot-rolled. ‡ 26.40c for hot-rolled. Production points for carbon base products: Stainless plates, sheet, Conshohocken, Pa. A3 and New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; nickel, copper-clad strip, Carnegie, Pa., S18. Production point for copper-base sheets is Carnegie, Pa. A13.

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(F.o.b. midwestern plants; per cent off list for less than case lots to consumers)

6 in. and shorter:

½-in. & smaller diam.	15
⅝-in. & ⅞-in.	18.5
1-in. and larger	17.5
Longer than 6 in.:	
All diams.	14
Lag bolts, all diams.:	
6 in. and shorter	23
over 6 in. long	21
Ribbed Necked Carriage	18.5
Blank	34
Plow	34
Step, Elevator, Tap and Sleigh Shoe	21
Tire bolts	#2
Boiler & Fitting-Up Bolts	31

NUTS

H.P. & C.P. Square:	Reg. Hvy.
½-in. & smaller	15 15
⅝-in. & ⅞-in.	12 6.5
1-in.-1½-in.	9 1
1⅛-in. & larger	7.5 1
H.P. Hex.:	
½-in. & smaller	26 22
⅝-in. & ⅞-in.	16.5 6.5
1-in.-1½-in.	12 2
1⅛-in. & larger	8.5 2
C.P. Hex.:	
½-in. & smaller	26 22
⅝-in. & ⅞-in.	23 17.5
1-in. & 1⅛-in.	19.5 12
1⅛-in. & larger	12 6.5

SEMIFINISHED NUTS

American Standard

(Per cent off list for less than case or keg quantities)

	Reg.	Hvy.
½-in. & smaller	35	28.5
6 in. or shorter:		
⅝-in. & ⅞-in.	29.5	22
1-in.-1½-in.	24	15
1⅛-in. & larger	13	8.5
⅞-in. & smaller		Light 35
½-in. to ⅞-in.		28.5
⅞-in. to 1½-in.		26

STEEL STOVE BOLTS

(F.o.b. plant; per cent off list in packages)

Plain finish	48 & 10
Plated finishes	31 & 10

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

⅝-in. & smaller	42
⅞-in. through 1 in.	34
Longer than 6 in.:	
⅝-in. & smaller	26
⅞-in. through 1 in.	4

SQUARE HEAD SET SCREWS

(Packaged; per cent off list)

1 in. diam. x 6 in. and shorter	38
1 in. and smaller diam. x over 6 in.	26

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller	35
¼-in. diam. & larger	16
N.F. thread, all diams.	10

RIVETS

F.o.b. midwestern plants Structural ½-in., larger 7.85c
⅞-in. under ..... 36 off

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers. . . List to list-plus-$1

FLUORSPAR

Metallurgical grade, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 70%, $43; 60%, $40.

Imported, net ton, duty paid, metallurgical grade, $33-$35.

ELECTRODES

(Threaded, with nipples, unboxed f.o.b. plant)

GRAPHITE

Diam. Inches	Length Inches	Cents per lb
17.18.20	60.72	17.85
8 to 16	48.60.72	17.85
7	48.60	19.57
6	48.60	20.95

CARBON

35.40	110	8.03
30	65.84.110	8.03
24	72 to 104	8.03
17 to 20	34.90	8.03

STAINLESS STEEL

Type	Sheets	C.R. Strip	Bars Wire Structurals
301	41.00	34.00	31.25
302	41.25	36.75	31.50
303	43.25	40.25	34.00
304	43.25	38.75	33.00
309	56.00	55.00	44.75
316	57.00	59.00	49.25
321	49.25	48.25	37.00
347	53.75	52.25	41.50
410	36.50	30.50	25.75
416	37.00	37.00	26.25
420	44.00	47.00	31.25
430	39.00	31.00	26.25
501	27.50	26.00	14.25
502	28.50	27.00	15.25

Bait. Types 301-347 sheet, except 303 and 309 E2.

Brackenridge, Pa., Sheets A4 quotes slight variations on Types 301-347.

Bridgeville, Pa., bars, wire, sheets & strip U4.

Butler, Pa., sheets and strip except Types 303, 309, 416, 420, 501 & 502, A10.

Carnegie, Pa., sheets and strip except Types 303, 416, 501 & 502 S18.

Cleveland, strip A7.

Detroit, strip M1 quotes 34.00c on Type 301; 36.50c, 302; 38.50c, 304; 58.50c, 316; 52.00c, 347; 30.50c, 410; 31.00c, 430.

Dunkirk, N. Y., bars, wire A4 quotes slight variations on Types 301-347.

Duquesne, Pa., bars U5

Fort Wayne, Ind., bars and wire, except Types 501 & 502 J6 quotes slight variations on Types 301-347.

Gary, Ind., sheets except Type 416 U5.

Harrison, N. J., strip and wire C18.

Massillon, O., all items, R2.

McKeesport, Pa., strip, Type 410; bars & wire, Types 410 through 430 and 31.25c on Type 302, 33.75c on 303, 32.75c on 304, 48.75c on 316, 36.75c on 321, 41.25c on 347 F2.

McKeesport, Pa., bars sheets except Type 416 U5.

Middletown, O., sheets and strip except Types 303, 416, 420, 501 and 502 A10.

Midland, sheets & strip C18.

Munhall, Pa., bars U5.

Pittsburgh, sheets C18.

Reading, Pa., strip except 34.25c on Type 301 and 58.00c on 309; bars, except 31.50c on Type 301 and 45.25c on 309 C4.

Sharon, Pa., strip, except Types 303, 309, 416, 501, 502 and 34.25c on Type 301 S3.

So. Chicago, Ill., bars & structurals U5.

Syracuse, N. Y., bars, wire & structurals C18.

Titusville, Pa., bars U4.

Wallingford, Conn., strip W2 quotes 0.25c higher.

Washington, Pa., bars, sheets & strip, except 0.25c higher on Type 301 J3.

Washington, Pa., Types 301 through 347 sheets & strip except 303, 309; 316 sheets 62.00c, strip 64.00c W4.

Watervliet, N. Y., structurals & bars A4 quotes variations on Types 301-347.

Waukegan, bars & wire A7.

West Leechburg, Pa., strip, A4 quotes slight variations on Types 301-347.

Youngstown, strip except Types 303, 309, 316, 416, 501 and 502 and 34.25c on Type 301 C8.

COAL CHEMICALS

Spot, cents per gallon, ovens
Pure, benzol . . . 30.00-35.00
Toluol, one deg. . . 26.00-33.00
Industrial xylol . . 25.00-33.50
Per ton bulk ovens
Sulphate of ammonia $32-$45
Cents per pound, ovens
Phenol, 40 (carlots, non-returnable drums) . . 17.25

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted.)

Sponge iron	Cents
98+ % Fe, carlots. .	17.00
Swedish, c.i.f. New York, in bags. .	8.85-9.95
Electrolytic iron:	
Annealed, 99.5% Fe,	42.50
Unannealed 99 + % Fe	36.50
Unannealed, 99 + % Fe (minus 325 mesh)	53.50
Powder Flakes	48.50
Carbonyl Iron:	
97.9-99.8% size 5 to 10 microns. .	83.00-148.00
Aluminum:	
Carlots, freight allowed	29.50
Atomized, 500 lb drums, freight allowed	32.50
Antimony	75.85
Brass, 20-ton lots	30.00-33.25
Bronze, 10-ton lots	51.25-60.00
Phosphor-Copper, 20-ton lots	50.00
Copper:	
Electrolytic	37.25
Reduced	33.75
Lead	26.30
Magnesium	75.00-85.00
Manganese:	
Minus 100-mesh	57.00
Minus 35 mesh	52.00
Minus 200 mesh	62.00
Nickel unannealed	86.00
Nickel-Silver 5-ton lots	45.00
Silicon	38.50
Solder (plus cost of metal)	8.50
Stainless Steel, 302	83.00
Zinc, 10-ton lots	25.00-32.50
Tungsten	Dollars
Melting grade, 99% 60 to 200 mesh; 1000 lb and over	6.00
Less than 1000 lb.	6.15
98.8% minus 65 mesh: 1000 lb and over	4.15
Less than 1000 lb.	4.25
Molybdenum: 99.9%, minus 200 mesh	3.24
Chromium, electrolytic 99% Cr. min.	3.50

METALLURGICAL COKE

Price per net ton

BEEHIVE OVENS

Connellsvll fur.	$14.50-15.00
Connellsvll fdy.	17.00-18.00
New River foundry	21.30
Wise county, foundry	15.95
Wise county, furnace	15.20

OVEN FOUNDRY COKE

Kearney, N. J. ovens	$22.75
Everett, Mass., Ovens	
New England, del.	*24.80
Chicago ovens	23.00
Chicago, del.	24.50
Terre Haute, ovens	22.50
Milwaukee, ovens	23.75
Indianapolis, ovens	22.75
Chicago, del.	26.42
Cincinnati, del.	25.85
Detroit, del.	26.85
Ironton, O., ovens	22.50
Cincinnati, del.	25.12
Painesville, O., ovens	24.00
Cleveland, del.	25.82
Erie, Pa., ovens	23.50
Birmingham, ovens	20.30
Birmingham, del.	21.60
Philadelphia, ovens	22.70
Nevillelsland Pa.,ovens	23.00
Swedeland, Pa., ovens	22.60
St. Louis, ovens	
St. Louis, del.	25.40
Portsmouth, O., ovens	22.50
Cincinnati, del.	25.12
Detroit, ovens	24.00
Detroit, del.	25.00
Buffalo, del.	26.89
Flint, del.	26.59
Pontiac, del.	25.47
Saginaw, del.	26.92

* Or within $4.15 freight zone from works.

"At National Cash Register we believe . . ."

STANLEY C. ALLYN
President, National Cash Register Company

"At National Cash Register we believe a thrifty employee is a better employee and a better citizen. By providing the Payroll Savings Plan for U. S. Defense Bonds we help our employees practice the thrift habit and build up a backlog of savings for their future security. By buying Bonds they become shareholders in their country."

The employee who joins the Payroll Savings Plan becomes *a man with an objective*—a young fellow who realizes that the systematic purchase of Defense Bonds is a sure way to the down payment on a home . . . a father who wants to provide for Junior's college education . . . an older man, with an eye to retirement and personal security.

The man with an objective is a better employee. He knows that a day lost from work is just that much out of his take-home savings. He doesn't take chances—wants to stay off the accident list. He has a new realization that better work on his part will lead to advancement—and a larger monthly allotment for Defense Bonds.

The man with an objective is a better citizen, holds his head a little higher. He is buying a growing share in America . . . helping to combat inflation . . . making a real contribution to the defense effort.

These employee and *employer* benefits of the Payroll Savings Plan are reflected in the records of thousands of companies. Figures show that as employee participation in a Payroll Savings Plan grows to 60%, 70% or higher, absenteeism decreases, the "Lost Time Accidents" curve goes down and production goes up.

If 60% or more of your employees are not Men With Objectives, do something about it. Phone, wire or write to Savings Bond Division, U. S. Treasury Department, Suite 700, Washington Building, Washington, D. C., and your State Director, Treasury Department, will show you how to install a Payroll Savings Plan, or how to build an existing Plan.

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STEEL
The Weekly Magazine of Metalworking

WAREHOUSE STEEL PRODUCTS

(Representative prices, cents per pound, for delivery within switching limits, subject to extras.)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	H.R. 18 Ga., Heavier*	C.R.	Gal. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.	H.R. Alloy 4140‡		Carbon	Floor
New York (city)	6.40	7.11	8.35	7.05	....	6.49	7.29	9.28	6.37	6.74	7.98
Jersey City (c'try)	6.10	6.91	8.25	6.75	....	6.19	6.99	10.48	6.07	6.44	7.68
Boston (city)	6.40	7.18	8.65	6.70	....	6.36	7.08	10.80	6.42	6.65	7.84
Boston (c'try)	6.26	6.98	8.45	6.50	....	6.16	6.88	10.60	6.22	6.45	7.64
Phila. (city)	6.04	6.97	8.35	6.60	7.11	6.29	7.16	10.48	6.10	6.38	7.29
Phila. (c'try)	5.79	6.72	8.10	6.35	6.86	6.04	6.91	10.23	5.85	6.13	7.04
Balt. (city)	5.74	7.00	8.40	6.23	....	6.21	6.83	....	6.33	6.33	7.37
Balt. (c'try)	5.54	6.80	8.20	6.03	....	6.01	6.63	....	6.13	6.13	7.37
Norfolk, Va.	6.78	....	....	....	....	6.04	7.30	....	6.30	6.30	7.15
Richmond, Va.	5.74	6.57	8.35	6.14	....	5.91	6.59	....	6.72	6.86	8.00
Wash. (w'hse)	6.05	7.26	8.49	6.50	....	6.50	7.26	....	6.60	6.65	7.86
Buffalo (del.)	5.74	6.52	8.43	6.30	....	5.72	6.63	10.68††	6.02	6.18	7.58
Buffalo (w'hse)	5.54	6.32	8.23	6.10	....	5.52	6.45	10.48††	5.82	5.98	7.38
Pitts. (w'hse)	5.50	6.32	7.85	5.50	6.90	5.45	6.20	10.30††	5.65	5.65	6.89
Detroit (w'hse)	5.79	6.50	8.47	6.15	7.15	5.74	6.64	10.45	6.09	6.14	7.21
Cleveland (del.)	5.74	6.52	8.16	5.85	7.14	5.82	6.60	8.91	6.15	6.02	7.39
Cleve. (w'hse)	5.54	6.32	7.96	5.65	6.94	5.62	6.40	8.71	5.95	5.82	7.19
Cincin. (w'hse)	5.84	6.38	8.29	5.77	....	5.75	6.64	10.49	6.09	6.14	7.28
Chicago (city)	5.74	6.52	8.05	5.69	....	5.67	6.50	10.30††	5.85	5.90	7.09
Chicago (w'hse)	5.54	6.32	7.85	5.49	....	5.47	6.30	10.10††	5.65	5.70	6.89
Milwau. (city)	5.90	....	8.21	5.85	....	5.83	6.81	10.46††	6.01	6.06	7.25
Milwau. (c'try)	5.70	....	8.01	5.65	....	5.63	6.61	10.26††	5.81	5.86	7.05
St. Louis (del.)	6.02	6.80	8.33	6.56	....	5.95	6.88	10.58	6.22	6.27	7.46
St. L. (w'hse)	5.82	6.60	8.13	6.36	....	5.75	6.68	10.38	6.02	6.07	7.26
Kans. City (city)	6.40	7.20	8.40	6.35	....	6.35	7.20	....	6.50	6.60	7.80
Kans. City (w'hse)	6.20	7.00	8.20	6.15	....	6.15	7.00	....	6.30	6.40	7.60
Birm'hm (city)	5.75	6.55	6.90§	5.70	....	5.70	7.53	....	5.85	6.10	8.25
Birm'hm (w'hse)	5.60	6.40	6.75§	5.55	....	5.55	7.52	....	5.70	5.95	8.23
Los Ang. (city)	6.50	8.30§	9.50	6.60	10.65	6.45	8.35	11.50	6.50	6.50	8.75
L. A. (w'hse)	6.30	8.10§	9.30	6.40	10.45	6.25	8.15	11.30	6.30	6.30	8.55
Seattle-Tacoma	7.07	8.64	9.65	7.70	....	6.70	9.05	10.35	6.54	6.83	8.73
San Francisco	6.64	7.88§	8.85§	6.43	....	6.72	8.20	11.15	6.45	6.50	8.50

* Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extra excluded); ‡ includes extra for 10 gage; § as rolled; ** 16 gauge; †† as annealed; ‡‡ 15 gage. Base quantities, 2000 to 9999 lb except as noted. Cold-rolled strip, 2000 lb and over; cold-finished bars, 2000 lb and over; ¹—500 to 1499 lb; ²—450 to 1499 lb; ³—3500 lb and over; ⁴—1000 to 1999 lb.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (natural), lower lake ports.

After adjustment for analysis, prices will be increased or decreased as the case may be for increases or decreases after Dec. 2, 1950, in applicable lake vessel rates, upper lake rail freights, dock handling charges and taxes thereon.

Old range bessemer	$8.70
Old range nonbessemer	8.55
Mesabi bessemer	8.45
Mesabi nonbessemer	8.30
High phosphorus	8.30

Eastern Local Ore

Cents per unit del., E. Pa.

Foundry and basic 56-62% concentrates contract	17.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%:	
Spot	nom.
Long-term contract	$20.00-24.00
North African hematites (spot)	26.00-28.00
Brazilian iron ore, 68-69% (spot)	30.00-31.00

Tungsten Ore

Net ton unit, duty paid

Foreign wolframite and scheelite, per net ton unit	$65.00
Domestic scheelite mines	65.00

Manganese Ore

Manganese, 48% nearby, $1.18-$1.22 per long ton unit, c.i.f. U. S. ports, duty for buyer's account; shipments against old contracts for 48% ore are being received from some sources at 85c-87c.

Chrome Ore

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African	
48% 2.8:1	$39.00-42.00
48% 3:1	44.00-45.00
48% no ratio	30.00-32.00
South African Transvaal	
44% no ratio	$27.00-28.00
48% no ratio	34.00-35.00
Brazilian	
44% 2.5:1 lump	nom.
Rhodesian	
45% no ratio	$29.00
48% no ratio	31.50-32.00
48% 3:1 lump	50.00-51.00
Domestic—rail nearest seller	
48% 3:1	$39.00

Molybdenum

Sulphide concentrates per lb. molybdenum content, mines	$1.00

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 21.75c per lb of contained Cr c.l., packed 22.60c, ton lot 23.80c, less ton 25.20c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%) Contract, carload, lump, bulk, max. 0.03% C 33.60c per lb of contained Cr, 0.04% C 31.50c 0.06% C 30.50c, 0.10% C 30.00c, 0.15% C 29.75c, 0.20% C 29.50c, 0.50% C 29.25c, 1% C 29.00c, 1.50% C 28.85c, 2% C 28.75c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High Carbon: (Cr 62-66%, C 5-7%). Contract, c.l., 8 M x D, bulk, 23.25c per lb of contained Cr. C.l., packed 24.15c, ton 25.50c, less ton 27.25c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, Low Carbon: (Cr 50-54%, Si 28-32%, C 1.25% max.) Contract, carload, packed, 8 M x D, 16.35c per lb of alloy; ton lot 17.2c; less ton lot, 18.4c, delivered; spot, add 0.25c.

Low-Carbon Ferrochrome Silicon: (Cr 34-41%, Si 42-49%, C 0.05% max.) Contract, carload, lump, 4" x down and 2" x down, bulk, 21.75c per lb of contained chromium plus 12.4c per pound of contained silicon; 1" x down, bulk 21.90c per pound of contained chromium plus 12.60c per pound of contained silicon. F.o.b. plant; freight allowed to destination.

Ferrochrome Silicon, No. 2: (Cr 36-39%, Si 36-39%, Al 7-9%, C 0.05% max.) 21.75c per lb of contained silicon plus 12.4c per lb of contained silicon plus aluminum 2" x down, delivered.

Chromium Metal: (Min 97% Cr and 1% Fe) Contract carload, 1" x D; packed, max 0.50% C grade, $1.08 per lb of contained chromium ton lot $1.10, less ton $1.12. Delivered. Spot add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.00c per lb of contained Si; packed 21.40c; ton lot 22.50c, f.o.b. Niagara Falls, freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 12.40c per lb of contained Si, carload packed 14.0c, ton lot 15.45c, less ton 17.1c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Contract, carload, lump, bulk, 14.3c per lb of contained Si, carload packed 15.6c, ton lot 16.75c, less ton 18.0c. Delivered. Spot, add 0.5c.

Note: Current prices on zirconium, calcium and briquetted alloys appeared on page 167. Mar. 3 issue; manganese, titanium and "other" ferroalloys, page 133, Mar. 24. Refractories prices were published on page 167, Mar. 3.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.) Add 0.7c to 85% ferrosilicon prices.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 17.5c per lb of contained Si, carload packed 18.7c, ton lot 19.65c, less ton 20.7c. Delivered. Spot, add 0.25c.

Silicon Metal: (Min 97% Si and 1% max Fe). C.l., lump, bulk, regular 20.0c per lb of Si, c.l. packed 21.2c, ton lot 22.1c, less ton 23.1c. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max 2% Fe grade analyzing min 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe.) Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.90c per lb of alloy, ton lots packed 11.30c, 200 to 1999 lb 11.65c, smaller lots 12.15c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 35-55%, Si 8-12 % max., C 3-3.5% max). Contract, any quantity, $3.10 per lb of contained V. Delivered. Spot, add 10c. **Crucible-Special Grades** (V 35-55%, Si 2-3.5% max., C 0.5-1% max), $3.20. **Primos and High Speed Grades** (V 35-55%, Si 1.50% max, C 0.20% max) $3.30.

Grainal: Vanadium Grainal No. 1, $1 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots $1.28 per lb contained V_2O_5, freight allowed. Spot, add 5c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more, 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered, spot, add 5c. F.o.b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 75c per pound; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Boresil: (3 to 4% B, 40 to 45% Si), $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%) contract, lump, carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

TUNGSTEN ALLOYS*

Ferrotungsten: (70-80%), 10,000 lb W or more, $5.00 per lb of contained W; 2000 lb W to 10,000 lb W, $5.10; less than 2000 lb W, $5.22.

Tungsten Powder: Carbon Reduced; (W 98.8% min) 1000 lb or more, $6.00 per lb of contained W, less than 1000 lb W, $6.15.

* Government ceiling prices, effective May 7, 1951, f.o.b. Niagara Falls, N. Y., basis.

CEILING PRICES, IRON AND STEEL SCRAP

Prices as set forth in Office of Price Stabilization ceiling price regulation No. 5, as amended Feb. 5, 1952.

STEELMAKING SCRAP COMPOSITE

Mar. 27	$43.00
Mar. 20	43.00
Feb. 1952	43.00
Mar. 1951	44.00
Mar. 1947	37.25

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

Basing point ceiling prices per gross ton from which maximum shipping prices are computed on scrap of dealer and industrial origin, and from which ceiling on-line and ceiling delivered prices are computed on scrap of railroad origin.

Grade 1 Basing Point	No. 1 Bundles Dealer, Industrial	No. 1 Heavy Melt Railroad
Alabama City, Ala.	$39.00	$41.00
Ashland, Ky.	42.00	44.00
Atlanta, Ga.	39.00	41.00
Bethlehem, Pa.	42.00	44.00
Birmingham, Ala.	39.00	41.00
Brackenridge, Pa.	44.00	46.00
Buffalo, N. Y.	43.00	45.00
Butler, Pa.	44.00	46.00
Canton, O.	44.00	46.00
Chicago, Ill.	42.50	44.50
Cincinnati, O.	43.00	45.00
Claymont, Del.	42.50	44.50
Cleveland, O.	43.00	45.00
Contesville, Pa.	42.50	44.50
Conshohocken, Pa.	42.50	44.50
Detroit, Mich.	41.15	43.15
Duluth, Minn.	40.00	42.00
Harrisburg, Pa.	42.50	44.50
Houston, Tex.	37.00	39.00
Johnstown, Pa.	44.00	46.00
Kansas City, Mo.	39.50	41.50
Kokomo, Ind.	42.00	44.00
Los Angeles	35.00	37.00
Middletown, O.	43.00	45.00
Midland, Pa.	44.00	46.00
Minnequa, Colo.	38.00	40.00
Monessen, Pa.	44.00	46.00
Phoenixville, Pa.	42.50	44.50
Pittsburg, Calif.	35.00	37.00
Pittsburgh, Pa.	44.00	46.00
Portland, Oreg.	35.00	37.00
Portsmouth, O.	42.00	44.00
St. Louis, Mo.	41.00	43.00
San Francisco	35.00	37.00
Seattle, Wash.	35.00	37.00
Sharon, Pa.	44.00	46.00
Sparrows Pt., Md.	42.00	44.00
Steubenville, O.	44.00	46.00
Warren, O.	44.00	46.00
Weirton, W. Va.	44.00	46.00
Youngstown, O.	44.00	46.00

Differentials from Base

Differentials per gross ton for other grades of dealer and industrial scrap:

O-H and Blast Furnace Grades	
2 No. 1 Bushelling	Base
3 No. 1 Heavy Melting	$1.00
4 No. 2 Heavy Melting	1.00
5 No. 2 Bundles	1.00
6 Machine Shop Turnings	10.00
7 Mixed Borings and Short Turnings	6.00
8 Shoveling Turnings	6.00
9 No. 2 Bushelling	4.00
10 Cast Iron Borings	6.00
Elec. Furnace and Fdry. Grades	
11 Billet, Bloom & Forge Crops	7.50
12 Bar Crops & Plate	5.00
13 Cast Steel	5.00
14 Punchings & Plate Scrap	2.50
15 Electric Furnace Bundles	2.00
Cut Structurals & Plate	
16 3 feet and under	3.00
17 2 feet and under	5.00
18 1 foot and under	6.00
19 Briquetted Cast Iron Borings	Base
Foundry Steel	
20 2 feet and under	Base
21 1 foot and under	2.00
22 Springs and Crankshafts	1.00
23 Alloy Free Turnings	3.00
24 Heavy Turnings	1.00
25 Briquetted Turnings	Base
26 No. 1 Chemical Borings	3.00
27 No. 2 Chemical Borings	4.00
28 Wrought Iron	10.00
29 Shafting	10.00
31 Old Tin & Terne Plated Bundles	10.00

Unprepared Grades

When compressed constitutes:

32 No. 1 Bundles	6.00
33 No. 2 Bundles	9.00
34 Other than material suitable for hydraulic compression	8.00

Restrictions on Use

(1) Prices for Grades 11 and 23 may be charged only when shipped to a consumer directly from an industrial producer, otherwise ceiling prices shall not exceed prices established for Grades 12 and 8, respectively.

(2) Prices established for Grades 26 and 27 may be charged only when sold for use for chemical or annealing purposes and in the case of producer, for briquetting and direct charge into an electric furnace, otherwise ceiling prices shall not exceed price established for Grade 10.

(3) Prices established for Grade 28 may be charged only when sold to a producer of wrought iron; otherwise ceiling price shall not exceed ceiling price for corresponding grade of basic open-hearth.

(4) Premiums for Grades 11-18, 20 and 21 may be charged only when sold for use in electric and acid open-hearth furnaces or foundries, or in basic O-H or blast furnace under NPA allocation or OPS authorization.

(5) Prices for Grade 29 may be charged only when sold for forging or rerolling purpose.

Special Pricing Provisions

(1) Sellers of Grades 26 and 27 may make an extra charge of $1.50 per ton for loading in box cars, or 75 cents per ton for covering gondola cars with a weather-resistant covering.

(2) Ceiling price of pit scrap, ladle scrap, salamander scrap, skulls, skimmings of scrap recovered from slag dumps and prepared to charging box size, shall be computed by deducting from the price of No. 1 heavy melting steel of dealer and industrial origin, the following amounts: Where iron content is 85% and over, $6; 75% and over, $10; is less than 75%, $12.

(3) Ceiling price of any inferior grade of scrap not listed shall not exceed the price of No. 1 bundles less $15.00.

Differentials from Base

Differentials per gross ton above or below the price of Grade 1 (No. 1 railroad heavy melting steel) for other grades of railroad steel scrap:

2 No. 2 Heavy Melting Steel	$2.00
3 No. 2 Steel Wheel	Base
4 Hollow Bored Axles and loco. axles with keyways between the wheelseats	Base
5 No. 1 Bushelling	3.50
6 No. 1 Turnings	3.00
7 No. 2 Turnings, Drillings & Borings	12.00
8 No. 2 Cast Steel and uncut wheelcenters	6.00
9 Uncut Frogs, Switches	Base
10 Axles, Tubes & Pipes	8.00
11 Structural, Wrought Iron and/or steel, uncut	6.00
12 Destroyed Steel Cars	8.00
13 No. 1 Steel Scrap	9.50
14 Scrap Rails, Random Lengths	2.00
15 Rerolling Rails	7.00
Cut Rails:	
16 3 feet and under	5.00
17 2 feet and under	6.00
18 18 inches and under	8.00
19 Cast Steel, No. 1	3.00
20 Uncut Tires	2.00
21 Cut Tires	5.00
Bolsters & Side Frames:	
Uncut	Base
23 Cut	3.00
24 Angles, Splice Bars & Tie Plates	5.00
25 Solid Steel Axles	12.00
26 Steel Wheels, No. 3 oversize	Base
27 Steel Wheels, No. 3	5.00
28 Spring Steel	5.00
29 Couplers & Knuckles	5.00
30 Wrought Iron	8.00
31 Fireboxes	6.00
32 Boilers	6.00
33 No. 2 Sheet Scrap	13.00
34 Carsides, Doors, Car Ends, cut apart	6.00
35 Unassorted Iron & Steel	6.00
36 Unprepared scrap, not suitable for hydraulic compression	8.00

Restrictions on Use

(1) Price established for Grade 15 may be charged only when purchased and sold for rerolling uses; otherwise, ceiling shall not exceed that for Grade 14.

(2) Price established for Grade 30 may be charged only when sold to a producer of wrought iron; otherwise, ceiling shall not exceed that for No. 1 heavy melting steel.

(3) Price for Grade 25 may be charged only when sold for rerolling and forging purposes; otherwise, ceiling shall not exceed that for base grade (No. 1).

CAST IRON SCRAP

Ceiling price per gross ton for following grades shall be f.o.b. shipping point:

Cast Iron:	
1 No. 1 (Cupola)	$49.00
2 No. 2 (Charging Box)	47.00
3 No. 3 (Hvy. Breakable)	45.00
4 No. 4 (Burnt Cast)	41.00
5 Cast Iron Brake Shoes	41.00
6 Stove Plate	46.00
7 Clean Auto Cast	52.00
8 Unstripped Motor Blocks	43.00
9 Wheels, No. 1	47.00
10 Malleable	55.00
11 Drop Broken Machinery	52.00

Restrictions on Use

(1) Ceiling shipping point price which a basic open-hearth consumer may pay for No. 1 cast iron, clean auto cast, malleable or drop broken machinery cast shall be ceiling price for No. 2 charging box cast.

(2) Ceiling shipping point price which any foundry other than a malleable iron producer may pay for Grade 10 shall be ceiling price for No. 1 cast iron.

Preparation Charges

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of dealer or industrial origin authorized by OPS are:

(1) For preparing into Grades No. 3, No. 4 or No. 2, $8.

(2) For hydraulically compressing Grade No. 1, $6 per ton; Grade No. 5, $8.

(3) For crushing Grade No. 6, $3. For preparing into:

(4) Grade No. 25, $6.

(5) Grade No. 19, $6.

(6) Grades No. 12, No. 13, No. 14, No. 16, or No. 20, $10.

(7) Grade No. 17 or No. 21, $11.

(8) Grade No. 18, $12.

(9) For hydraulically compressing Grade No. 15, $8.

(10) For preparing into Grade No. 28, $10.

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of railroad origin shall be:

(1) For preparing into Grade No. 1 and Grade No. 2, $8.

(2) For hydraulically compressing Grade No. 13, $6.

For preparing into:

(3) Grade No. 16, $4.

(4) Grade No. 17, $5.

(5) Grade No. 18, $7.

(6) Grade No. 21, $4.

(7) Grade No. 23, $4.

Ceiling fees per gross ton which may be charged for intransit preparation of cast iron are limited to:

(1) For preparing Grade No. 8 into grade No. 7, $9.

(2) For preparing Grade No. 3 into Grade No. 11, $7.

(3) For preparing Grade No. 3 into Grade No. 1, $4.

Whenever scrap has arrived at its point of delivery and consumer engages a dealer to prepare such scrap, no fee may be charged for such services unless consumer obtains prior written OPS approval.

Commissions

No commission shall be payable to a broker in excess of $1.

Premium for Alloy Content

No premium may be charged for alloy content except: $1.25 per ton for each 0.25% of nickel where scrap contains not less than 1% and not over 5.25% nickel; $2 per ton for scrap containing not less than 0.15 per cent molybdenum and $3 for scrap containing not less than 0.65% molybdenum; for scrap containing not less than 10% manganese, $4 for scrap in sizes larger than 12 x 24 x 8 in., and $14 for scrap cut in that size or smaller (applicable only if scrap is sold for electric furnace uses or on NPA allocation); $1 for scrap conforming to SAE 52100.

Switching Charges

Switching charges to be deducted from basing point prices of dealer, industrial and nonoperating railroad scrap, to determine ceiling shipping point prices for scrap originating in basing points are per gross ton:

Alabama City, Ala., 43c; Ashland, Ky., 47c; Atlanta, 51c.

Bethlehem, Pa., 52c; Birmingham, 50c; Brackenridge, Pa., 53c; Buffalo, 53c; Butler, Pa., 65c.

Canton, O., 51c; Chicago (including Gary, Ind.), $1.34; Cincinnati (including Newport, Ky.), 65c; Claymont, Del. (including Chester, Pa.), 29c; Cleveland, 76c.

Contesville, Pa., 56c; Conshohocken, Pa., 29c.

Detroit, 95c; Duluth, Minn., 50c.

Harrisburg, Pa., 51c; Houston, 57c.

Johnstown, Pa., 75c.

Kansas City, Mo., 78c; Kokomo, Ind., 51c.

Middletown, O., 26c; Midland, Pa., 75c; Minnequa, Colo., 33c; Monessen, Pa., 51c.

Phoenixville, Pa., 51c; Pittsburg, Calif., 65c; Pittsburgh (including Bessemer, Homestead, Duquesne, Munhall), 93c; Portland, Oreg., 52c; Portsmouth, O., 51c.

St. Louis (including Federal, Granite City, E. St. Louis, Madison, Ill.), 51c; San Francisco (including So. San Francisco, Niles, Oakland), 66c; Seattle, 59c; Sharon, Pa., 75c; Sparrows Point, Md., 26c; Steubenville, O., 51c.

Warren, Pa., 75c; Weirton, 70c.

Youngstown, 75c.

HAMILTON, ONT.

(Delivered Prices)

Heavy Melt	$35.00
No. 1 Bundles	35.00
No. 2 Bundles	35.00
Mechanical Bundles	31.50
Mixed Steel Scrap	31.00
Mixed Borings, Turnings	32.00
Rails, Remelting	35.00
Rails, Rerolling	38.00
Bushelling	29.50
Bushellings new factory:	
Prepd.	33.00
Unprepd.	31.00
Short Steel Turnings	32.00
Cast Iron Grades*	
No. 1 Machinery Cast	50.00

* F.o.b. shipping point.

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Improve Quality

Pre-Assembly of washer and screw provides an easier and faster means of assembling parts that require lock-washer protection under each screw head. And this sets up a chain of savings that begins with ordering and extends through stocking, inventory, handling, and assembly. In driving, all waste-motion is eliminated, for there is no fumbling and fitting of washer to screw. And American Phillips driving is *automatically straight driving*, so product quality is protected . . . while spoilage and lost material are held down to the vanishing point.

American Phillips Sems* Assemblies are still another type of fastening that makes American one of the world's most complete lines of screws. Now add American's modern mass-production facilities and quality control, and you've got *three* good business reasons why it always pays to "Buy American."

*U. S. Patents Nos. 2,113,424 and 2,113,425

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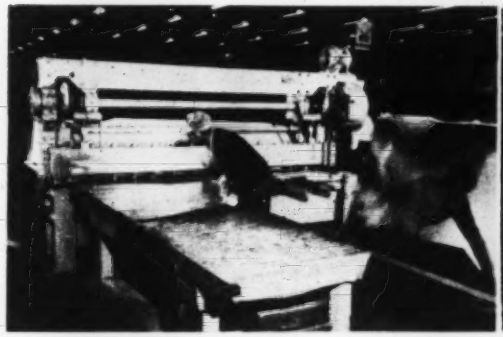
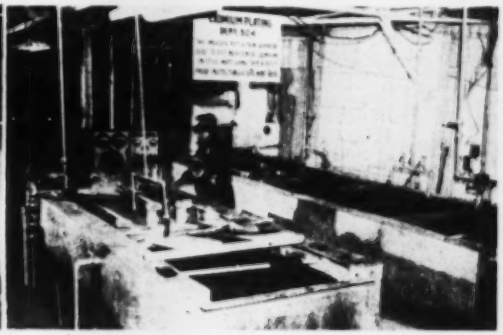
The Metal Market





B-36 Preliminaries: Parts Get a Start

Diversified manufacturing techniques are required to make elevators, rudders and door assemblies for Convair B-36s at Luscombe Airplane Co.'s Garland, Tex., plant. A $450,000 building program is underway at the Texas Engineering & Mfg. Co. subsidiary. In photo at left sheets of aluminum alloy start their trip down the assembly line after a check for imperfections and a pass through shears that cut them to proper size. At right is the cadmium plating section where steel parts get a rustproof plating. The Luscombe plant is completely engaged in defense work

More lenient metals allocations and expectations of further bonuses by fall make fabricators optimistic that supply-demand balance will come sooner than predicted

FABRICATORS SENSE a healthier demand-supply situation will come about sooner than official Washington predicts.

Even small companies seem more optimistic about their future. They believe that since they've lasted this long on short rations, they can stay in business the rest of the way to complete decontrol.

Lenient — Nearly all fabricators, large or small, see something cheerful in third-quarter allotments. They show a surprising leniency over those of the second quarter, even after original allocations were supplemented.

In the hard-hit consumer goods industries, for example, aluminum allocations were raised 37 per cent over second quarter and copper products were raised about 19 per cent.

Significant—More significant is the over-allotment of these metals. Copper allocations in the second quarter were 106.5 per cent of supply. In the third quarter they are set at 116.2 per cent.

A breakdown of over-allotments reads this way: Copper brass mill products, 16 per cent; copper wire mill products, 10 per cent; copper foundry products, 23; aluminum, 13.

Grain of Salt—Third-quarter official allowances, for the most part, are being taken with a grain of salt. After the extra handouts manufacturers received so far, they'll be expecting more bonuses by fall.

Bolivia: Last Tin Holdout

Bolivian tin producers are the lone holdouts in contract negotiations with RFC, now that the Belgians have come to terms. A Bolivian settlement shouldn't be far off. Belgian Congo will ship a minimum of 7000 tons and a maximum of 9000 tons yearly at a price of $1.2075 per pound delivered at American ports. Contract is for two years and is renewable annually. If a more favorable price is granted other producers, price will be advanced accordingly.

Nickel Substitute Expansion

The sole American producer of electrolytic manganese will double its production of the metal by 1954. Electro Manganese Corp., Knoxville, Tenn., will build a new plant with a $2.25 million loan from Defense Materials Procurement Agency. Present production of the metal is 7.2 million pounds a year.

DMPA will buy, at a discount, up to 36 million pounds of the metal produced, if it can't be sold to other buyers at regular prices. The plant will go into operation in late 1953 or early 1954 and the contract will extend for five years thereafter.

Because electrolytic manganese is almost entirely devoid of impurities found in low carbon ferromanganese, it can be used as a partial replacement for nickel in making certain types of stainless steel welding rods and many types of nonferrous alloys.

Aluminum Producers' Dilemma

American aluminum producers are caught between currents because of Aluminum Co. of Canada's proposal to expand capacity if the U. S. will guarantee to import a portion of the increased production until 1959. U. S. producers say they recognize the necessity of a healthy stockpile level in event of emergency, but believe domestic capacity is sufficient for both that purpose and normal demand. Any further additions to capacity might lead to overexpansion.

One reason for much uncertainty over the proposal: No one is yet sure how much aluminum is needed in a normal post-emergency market. The quick reversal of the supply situation gave producers pause. With decontrol of aluminum in the fourth quarter a probability, there may be a real selling job ahead.

Alcan's proposal is still causing a variety of reactions. Commerce Secretary Sawyer favors the idea. The Pentagon says the Kitimat project could be too easily destroyed in a war because of its proximity to Russia. Even Congress is getting in the act, quizzing Defense Production Administrator Manly Fleischmann on the proposal.

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

Primary Metals

Copper: Electrolytic 24.50c, Conn. Valley, Lake 24.62½c, delivered.

Brass Ingots: 85-5-5-5 (No. 115) 27.25c; 88-10-2 (No. 215) 40.00c; 80-10-10 (No. 305) 33.00c; No. 1 yellow (No. 405) 23.25c.

Zinc: Prime western 19.50c; brass special 19.75c; intermediate 20.00c; East St. Louis, high grade 20.50c, delivered.

Lead: Common 18.50c; chemical 18.90c; corroding 18.90c; St. Louis.

Primary Aluminum: 99% plus, ingots 19.00c; pigs 18.00c. Base prices for 10,000 lb and over. Freight allowed on 500 lb or more but not in excess of rate applicable on 30,000 lb c.l. orders.

Secondary Aluminum: Piston alloys 20.50c; No. 12 foundry alloy (No. 2 grade) 19.50c; steel deoxidizing grades, notch bars, granulated or shot, Grade 1, 18.80c; grade 2, 18.60c; grade 3, 18.40c; grade 4, 18.20c.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over 24.50c, f.o.b. Freeport, Tex.

Tin: Grade A, prompt 121.50c.

Antimony: American, 99.90-99.8% and over but not meeting specifications below 50.00c; 99.8% and over, arsenic 0.05% max., other impurities 0.1% max.) 50.50c, f.o.b. Laredo, Tex., for bulk shipments.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 56.50c; 25-lb pigs, 59.15c; "XX" nickel shot, 60.15c; "F" nickel shot or ingots, 5c addition to cast iron, 56.50c. Prices include import duty.

Mercury: Open market, spot, New York, $207-$210 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $1.56 per lb of alloy, f.o.b. Reading, Pa.

Cadmium: "Regular" straight or flat forms, $2.55 del., special or patented shapes $2.80.

Cobalt: 97.99%, $2.40 per lb for 500 lb (kegs); $2.42 per lb for 100 lb (case); $2.47 per lb under 100 lb.

Gold: U. S. Treasury $35 per ounce.

Silver: Open market, New York 88.00c per oz.

Platinum: $90-$93 per ounce from refineries.

Palladium: $24 per troy ounce.

Iridium: $200 per troy ounce.

Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Ceiling prices, cents per pound, f.o.b. mill, effective Aug. 23, 1951)

Sheet: Copper 41.68; yellow brass 38.28; commercial bronze 95% 41.61, 90% 41.13; red brass 85% 40.14, 80% 39.67; best quality 39.45; nickel silver 18% 53.14; phosphor-bronze grade A, 5% 61.07.

Rod: Copper, hot-rolled 37.53, cold-drawn 38.78; yellow brass free cutting 32.34; commercial bronze 95% 41.30, 90% 40.82; red brass 85% 39.83, 80% 39.36.

Seamless Tubing: Copper 41.72; yellow brass 41.29; commercial bronze 90% 43.79; red brass, 85% 43.05.

Wire: Yellow brass 38.57; commercial bronze 95% 41.90, 90% 41.42; red brass 85% 40.43, 80% 39.96; best quality brass 39.44.

(Base prices, effective Dec. 26, 1951)

Copper Wire: Bare, soft, f.o.b. eastern mills, 100,000 lb lots 28.545, 30,000 lb lots 28.67, l.c.l. 29.17. Weatherproof, 100,000 lb 30.35, 30,000 lb 30.60, l.c.l. 31.10. Magnet wire, del., 15,000 lb or more, 34.50, l.c.l. 35.25.

ALUMINUM

(30,000 lb base; freight allowed on 500 lb or more, but not in excess of rate applicable on 30,000 lb c.l. orders)

Sheets and Circles: 2s and 3s mill finish c.l.

Thickness Range Inches	Widths or Diameters, Inches	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	30.1	...	...
0.135-0.096	12-48	30.6	...	...
0.095-0.077	12-48	31.2	29.1	33.2
0.076-0.061	12-48	31.8	29.3	33.4
0.060-0.048	12-48	32.1	29.5	33.7
0.047-0.038	12-48	32.5	29.8	34.0
0.037-0.030	12-48	32.9	30.2	34.6
0.029-0.024	12-48	33.4	30.5	35.0
0.023-0.019	12-36	34.0	31.1	35.7
0.018-0.017	12-36	34.7	31.7	36.6
0.016-0.015	12-36	35.5	32.4	37.6
0.014	12-24	36.5	33.3	38.9
0.013-0.012	12-24	37.4	34.0	39.7
0.011	12-24	38.4	35.0	41.2
0.010-0.0095	12-24	39.4	36.1	42.7
0.009-0.0085	12-24	40.6	37.2	44.4
0.008-0.0075	12-24	41.9	38.4	46.1
0.007	12-18	43.3	39.7	48.2
0.006	12-18	44.8	41.0	52.8

* Lengths 72 to 180 inches. † Maximum diameter, 26 inches.

Screw Machine Stock: 5000 lb and over.

Dia. (in.) of distance across flats	Round R317-T4	Hexagonal R-317-T4	Hexagonal 178-T4
0.125	52.0	...	...
0.156-0.0188	44.0	...	...
0.219-0.313	41.5	...	...
0.375	40.0	46.0	48.0
0.406	40.0	...	...
0.438	40.0	46.0	48.0
0.469	40.0	...	...
0.500	40.0	46.0	48.0
0.531	40.0	...	...
0.563	40.0	...	45.0
0.594	40.0	...	...
0.625	40.0	43.5	45.0
0.688	40.0	...	45.0
0.750-1.000	39.0	41.0	42.5
1.063	39.0	...	41.0
1.125-1.500	37.5	39.5	41.0
1.563	37.0	...	...
1.625	36.5	...	39.5
1.688-2.000	36.5	...	...

LEAD

(Prices to jobbers f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets: Full rolls, 140 sq ft or more $24.00 per cwt; add 50c cwt 10 sq ft to 140 sq ft. Pipe: Full coils $24.00 per cwt. Traps and bends: List prices plus 65%.

ZINC

Sheets 26.50c, f.o.b. mill 36,000 lb and over. Ribbon zinc in coils, 25,000, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 25.50-26.50c; over 12-in., 25.50-26.50c.

"A" NICKEL

(Base prices f.o.b. mill)

Sheets, cold-rolled, 77.00c. Strip, cold-rolled, 83.00c. Rods and shapes, 73.00c. Plates, 75.00c. Seamless tubes, 106.00c.

MONEL

(Base prices f.o.b. mill)

Sheets, cold-rolled 60.50c. Strip, cold-rolled 61.50c. Rods and shapes, 58.50c. Plates, 59.50c. Seamless tubes, 93.50c. Shot and blocks, 53.50c.

MAGNESIUM

Extruded Rounds 12 in. long, 1.31 in. in diameter, less than 25 lb, 55.00-62.00c; 25 to 99 lb, 45.00-52.00c; 100 lb to 5000 lb, 41.00c.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $15; sheared mill plate, $12; strip, $15; wire, $10; forgings, $6; hot-rolled and forged bars, $6.

DAILY PRICE RECORD

	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
1952								
Mar. 1-27	24.50	18.80	19.50	121.50	19.00	50.00	56.50	88.00
Feb. 1-29	24.50	18.80	19.50	121.50	19.00	50.00	56.50	88.000
Jan. Avg.	24.50	18.80	19.50	109.404	19.00	50.00	56.50	88.00
Feb. Avg.	24.50	18.80	19.50	121.50	19.00	50.00	56.50	88.00
1951								
Dec. Avg.	24.50	18.80	19.50	103.00	19.00	50.00	56.50	88.00
Nov. Avg.	24.50	18.80	19.50	103.00	19.00	44.36	56.50	88.00
Oct. Avg.	24.50	18.726	19.426	103.00	19.00	42.00	56.50	88.12
Sept. Avg.	24.50	18.50	17.50	103.00	19.00	42.00	56.50	90.16
Aug. Avg.	24.50	18.50	17.50	103.00	19.00	42.00	56.50	90.16
July Avg.	24.50	18.50	17.50	106.00	19.00	42.00	56.50	90.16
June Avg.	24.50	18.50	17.50	117.962	19.00	42.00	56.50	88.492

NOTE: Copper: Electrolytic, del. Conn. Valley. Lead, common grade, del. St. Louis; Zinc, prime western, E. St. Louis; Tin, Straits, del. New York. Aluminum primary ingots, 99%, del. Antimony, bulk, f.o.b. Laredo, Tex. Nickel, electrolytic cathodes, 99.9%, base sizes at refinery unpacked. Silver, open market, New York. Prices cents per pound, except silver, cents per ounce.

Plating Materials

Chromic Acid: 99.9% flakes, f.o.b. Philadelphia, carloads, 28.00c; 5 tons and over 28.50c; 1 to 5 tons, 29.00c; less than 1 ton 29.50c.

Copper Anodes: Base 2000 to 5000 lb; f.o.b. shipping point, freight allowed; Flat, rolled, 38.34c; oval 37.84c.

Nickel Anodes: Rolled oval, carbonized, carloads, 74.50c; 10,000 to 30,000 lb, 75.50c; 3000 to 10,000 lb, 76.50c; 500 to 3000 lb 77.50c; 100 to 500 lb, 79.50c; under 100 lb, 82.50c; f.o.b. Cleveland.

Nickel Chloride: 36.50c in 100 lb bags; 34.50c in lots of 400 lb through 10,000 lb; 34.00c over 10,000 lb, f.o.b. Cleveland, freight allowed on 400 lb or more.

Sodium Stannate: 25 lb cans only, less than 100 lb. to consumers 86.7c; 100 or 350 lb drums only, 100 to 600 lb 71.60c; 700 to 1900 lb, 69c; 2000 to 9900 lb, 67.3c. Freight allowed east of Mississippi and north of Ohio and Potomac rivers.

Tin Anodes: Bar, 1000 lb and over, $1.375; 500 to 999 lb, $1.38; 200 to 499 lb, $1.385; less than 200 lb, $1.40. Freight allowed east of Mississippi and north of Ohio and Potomac.

Zinc Cyanide: 100 lb drums, less than 10 drums 54.30c, 10 or more drums, 52.30c, f.o.b. Niagara Falls, N. Y.

Stannous Sulphate: 100 lb kegs or 400 lb bbl, less than 2000 lb $1.11, more than 2000 lb, $1. Freight allowed east of Mississippi and north of Ohio and Potomac rivers.

Stannous Chloride (Anhydrous): In 400 lb bbl, 98.5c; 100 lb kegs 99.5c. Freight allowed.

Scrap Metals

Brass Mill Allowances

Ceiling prices in cents per pound for less than 20,000 lb, f.o.b. shipping point, effective June 26, 1951.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	21.50	21.50	20.75
Yellow Brass	19.125	18.875	17.875
Commercial Bronze			
95%	20.50	20.25	19.75
90%	20.50	20.25	19.75
Red Brass			
85%	20.25	20.00	19.375
80%	20.125	19.875	19.375
Muntz metal	18.125	17.875	17.375
Nickel silver, 10%	21.50	21.25	10.75
Phos. Bronze, 5%	25.25	25.00	24.00

Copper Scrap Ceiling Prices

(Base prices, cents per pound, less than 40,000 lb f.o.b. point of shipment)

Group 1: No. 1 copper 19.25; No. 2 copper wire and mixed heavy 17.75; light copper 16.50; No. 1 borings 19.25; No. 2 borings 17.75; refinery brass, 17.00 per lb of dry Cu content for 50 to 60 per cent material and 17.25 per lb for over 60 per cent material.

Group II: No. 1 soft red brass solids 18.50; No. 1 composition borings 19.25 per lb of Cu content plus 63 cents per lb of tin content; mixed brass borings 19.25 per pound of Cu content plus 60 cents per lb of tin content; unlined red car boxes 18.25; lined red car boxes 17.25; cocks and faucets 16.00; mixed brass screens 16.00; zincy bronze solids and borings 16.25.

Zinc Scrap Ceiling Prices

(Cents per pound, f.o.b. point of shipment) Unsweated zinc dross, 13.75c; new clippings and trimmings, 15.50c; engravers' and lithographers' plates, 15.50c; die cast slabs, min. 90% zinc, 13.75c; old zinc scrap, 12.25c; forming and stamping dies, 12.25c; new die cast scrap, 11.75c; old zinc die cast radiator grille, 11.50c; old die cast scrap, 10.50c.

Lead Scrap Ceiling Prices

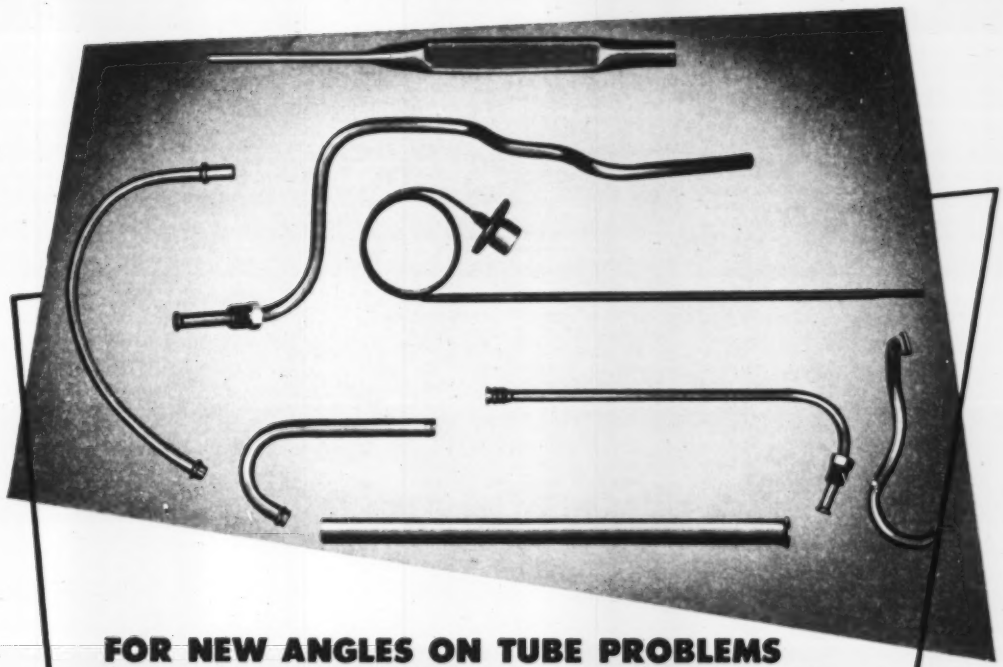
(F.o.b. point of shipment)

Battery lead plates, 19.00c per lb of lead and antimony content, less smelting charge of 2 cents per lb of material in lots 15,000 lb or more; less 2.25c in lots less than 15,000 lb, or a flat price of 11.25c a pound of battery plates. Used storage batteries (in boxes) drained of liquid, 7.85c for 15,000 lb or more; 7.45c for less than 15,000 lb. Soft lead scrap, hard lead scrap, battery slugs, cable lead scrap or lead content of lead-covered cable scrap, 17.25c in lots of 20,000 lb or more; 16.50c in lots under 20,000 lb.

Aluminum Scrap Ceiling Prices

(Cents per pound, f.o.b. point of shipment, less than 5000 lb)

Segregated plant scrap: 2s solids, copper free, 10.50; high grade borings and turnings, 8.50; No. 12 piston borings and turnings, 7.50; Mixed plant scrap; Copper-free solids, 10.00; dural type, 9.00. Obsolete scrap: Pure old cable, 10.00; sheet and sheet utensils, 7.25; old castings and forgings, 7.75; clean pistons, free of struts, 7.75; pistons with struts, 5.75.



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Sheets, Strip . . .

Sheet and Strip Prices, Page 136 & 137

New York—Most carbon sheet producers are booking orders for delivery beyond second quarter. Some are accepting tonnage for July only, their present plan being to go on a month-to-month basis on the theory it will enable them to keep a close rein on schedules. Third quarter production of carbon material may be off somewhat from the preceding three-month period by virtue of vacations, not only at the mills, but at consuming plants and other seasonal influences. However, producers look for fair activity. Various mills have long since opened books for third quarter on such specialties as long ternes, silicon sheets and straight chromium material. Business in these items has been sluggish except in high grade silicon sheets, and producers consequently are willing to accept tonnage where available for the more extended delivery positions. Some, however, have shown hesitancy in booking beyond third quarter.

Boston—Slackening in cold-rolled sheet demand for second quarter has tightened in spots. Automobile parts suppliers and other fabricators are taking supplemental allotments. More third quarter flat-rolled volume is being booked. With few exceptions, producers of consumer durable goods are well fixed for steel at the current rate of operations. This applies also to stamping shops. Not all users are taking supplemental allotments. Backlogs with cold strip converters are down and monthly rolling schedules are filling less readily.

Philadelphia—With limitations on production of automobiles and other consumer goods being lifted for third quarter a slight stir is noted in lagging demand for sheets and strip. Producers see enough business ahead to keep them active during second quarter. Premium priced producers show signs of concern. A continuous galvanizing unit is expected to go into operation at Sparrows Point, Md., early in April.

Pittsburgh—Books are opening for third quarter. Hot-rolled material is strong here and mills are having no trouble filling cold-rolled schedules. Producers see good business through second quarter. Galvanized and long ternes are strong as is strip although some sizes have weakened. Mills say it might be nip and tuck on some products during third quarter. High cost conversion deals are largely a thing of the past. If a strike comes, the supply situation will tighten up quickly.

Cleveland—Loosening of restrictions on production of consumer durable goods in third quarter is expected to quicken demand for the light, flat-rolled products which have shown a lagging tendency over the recent past. Extent to which volume will be stimulated is seen dependent on the vitality displayed in demand for consumer goods at the retail level. Currently, sheetmakers are opening books for third quarter. The larger interests are fully booked for the quarter beginning April, but some of the smaller and premium-priced producers still have open space in schedules for the period.

Detroit—Premium price mills will have to bring their prices down to competitive level by third quarter say the automakers. Stampers already are satisfying their needs at the standard market prices. One mill has been advised its premium price will be acceptable only through next quarter unless conditions in flat-rolled material firm up. Demand from automakers is up moderately, reflecting higher output scheduled for next quarter.

Chicago—Mills are opening books for third quarter. Indications are full schedules are assured for the July-September period. This is likely even in cold-rolled sheets. Starting with April output of galvanized sheets will be stepped up about 10 per cent.

St. Louis—Cold-rolled sheet demand is spotty. Books are filled through third quarter. There have been some order cancellations but mills generally haven't tried to replace them with deliveries 60 to 75 days behind schedule because of minor breakdowns and repairs.

Los Angeles—Stovemakers and some appliance manufacturers are back on mill order books for heavier tonnages of sheets and strip. The Wherry $90 million defense housing project in San Diego is expected to sustain demand for flat-rolled products, reinforcing bars and light structurals.

Steel Bars . . .

Bar Prices, Page 135

Boston—Improvement in carbon bar supply is confined to small and intermediate sizes. Larger bar production includes a sizable chunk for defense requirements, including shell steel. Pantex Mfg. Corp., Pawtucket, R. I., booked a contract for projectiles. Bessemer grades have been replaced substantially by resulphurized specifications. Bessemer capacity has been all but eliminated by two mills formerly supplying this district. This trend started in Buffalo some time back. Synthetic bessemer can be produced at lower cost in large open hearths. Machining properties have steadily improved.

New York—Hot carbon bar sellers are opening books for third quarter, at least for the first month of the period. Demand is active. Occasional spot openings in mill schedules are quickly filled by companies that have not been able to fully cash in their tickets. Large bars, linked particularly with munition requirements, are in especially short supply. There is no apparent oversupply of any size or shape, however. In cold drawn carbon, most sellers opened books some time ago on shipments beyond first half and in some cases are fairly well booked throughout third quarter on a number of sizes and specifications. Some are accepting orders for fourth quarter. Hot and cold alloy bar deliveries extend into third quarter.

Philadelphia—Carbon producers will enter second quarter with substantial arrearages. Mills are particularly oversold on larger sizes.

Pittsburgh—Mills have been holding off opening third quarter books due to the uncertain labor outlook but now are going ahead. Demand is high for all types and sizes of bars but especially is firm for the quality steels in sizes larger than 1½ in., principally forging grades. Additional CMP tickets for second quarter recently given the automotive industry are not finding available rolling time open here. Mills see substantial carryover into next quarter. Producers expect tight supply will extend far into third quarter.

Cleveland—Books are being opened for third quarter but bar sellers are not too sanguine they can fill all the requests for tonnage coming to them. Expected substantial carryover from second quarter will restrict bookings. With munitions and other military requirements for bars, especially larger sizes, still rising, producers see little chance for any material easing in supply conditions soon. Here and there slightly improved supply is noted in the smaller sizes but it is not sufficient to substantially alter the general outlook.

Semifinished Steel . . .

Semifinished Prices, Page 135

Pittsburgh—District steelmaking operations advanced one-half point to 103.5 per cent of rated capacity from the previous week's revised rate of 103. The Wheeling rate moved up one-half point to 100 per cent. Steelmaking was not affected by the start to shut down operations due to the steel strike threat. Only some district coke ovens were cooled and a few blast furnaces banked.

Los Angeles—Study by Kaiser Steel Corp., shows steel mills in seven western states supplied 3.6 million tons, and eastern mills 2.6 million tons of a total of 6 million tons of finished steel products consumed in the West in 1951. With a $65 million expansion program Kaiser hopes to narrow the gap between western consumption and supply of steel.

Plates . . .

Plate Prices, Page 135

Pittsburgh—Demand continues strong for plate. Lighter gages rolled on continuous hot-strip mills are tight but not to the same degree as the heavier gages rolled on conventional mills. Some fabricators and other consumers that were granted additional second quarter CMP tickets are finding district mills completely booked up with no available rolling time open to them.

Boston—Mills are opening books for third quarter. Shortage in heavy and wide plates continues. More light plates are available but part of this tonnage is in widths too narrow for some shops. Heavier demand on shipbuilding account in late second quarter will take more wider light plates. Additional tonnage for second quarter has been placed by shops with supplemental allotments.

New York—The overall position in plates is strong. Heavy gages are in tight supply. This is not so true of the lighter thicknesses but there is enough demand to indicate highly sustained production for weeks to come, excepting at certain plants where unusually high premiums are still being asked. Most producers recently opened their books for third quarter.

Philadelphia—Mill order books are

NOTCH-COIL RINGS
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Stress-relieved notch-coil preforms snap off coil, snap snugly around refrigerator gas strainers in one time-saving motion.

STRESS RELIEVED notch-coil rings allowed automatic brazing of noxious gas strainers, raising rate from 60 to 480 per hour . . . costs slid from $3 to 80 cents . . . rejects were cut 95%. *Stress-relieved* rings assured a gas-tight bond under all conditions and eliminated the poor fill, spillage and costly alloy waste of previously used ordinary rings. Notch-coil eliminated tangling, distortion, breakage and sped up handling. Rings are *job-engineered to fit your needs* in *any* thickness and diameter in *butt, lap or gap* design. *Stress-relieved, notch-coil* rings are made from *Silfos* and *Easy-Flo wire.*

Machine-wound rings distorted when heat was applied, causing poor bond and spillage. Wide separation of ends prevented achieving required fill for a strong, gas-tight joint. Brazing costs with this method were prohibitively high.

Stress-relieved preforms maintain —.001-inch tolerance throughout heating cycle, requiring minimum amount of alloy. Leakage dropped to less than .5%. Solder flows evenly into joint for complete fill, eliminating spillage and waste.

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Suburb of Milwaukee

open for third quarter, though for only the first month in the case of some sellers. Demand continues active for the heavier gages. Lighter thicknesses are in fairly brisk demand.

Chicago — Plate fabricators find strip-mill sizes of plates more readily available but they still can't get all of the heavy plates they need.

St. Louis—Plate schedules are filled through third quarter, primarily on pipeline orders. Commercial demand is picking up but all of it cannot be filled locally.

Seattle—Portland is considering a $5 million general bid for the 25.5 mile, 52 to 56-in. Bull Run water conduit involving 16,000 tons of plates. Local fabricators hold good order backlogs, mostly small jobs. Continued scarcity of plates restricts bidding.

Wire . . .

Wire Prices, Page 137

Boston—Product-mix is unsatisfactory with the wire mills, reflecting uneven demand. There are some openings in May schedules. Numerous finishing departments are operating below capacity. In carbon grades coarser sizes are slightly more active than fine wire. Buying is retarded by adjustments in inventories. Cancellations on alloy heading wire are substantial. Screw manufacturers have built up some inventory of finished fastenings. Nail jobbers are well supplied. Rope wire is slow. Aircraft procurement is erratic and below expectations. In spots substantial direct contracts have been placed taking considerable wire. Lisson-Melen Co., Lynn, has one for rack assemblies taking a large tonnage of low carbon wire. Atlantic Wire Co., Branford, Conn., has a government order for wire approximating $400,000.

Los Angeles—Higher auto production quotas have stiffened automakers' wire requirements.

Tubular Goods . . .

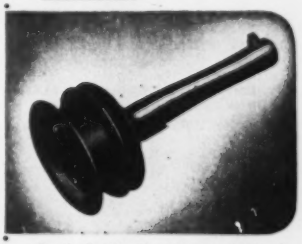
Tubular Goods Prices, Page 139

Boston—More merchant steel pipe distributors are turning down part or all of May and June allotments of buttweld. Seamless and pressure pipe have eased only slightly. Galvanized has opened up to where more volume is offered by most mills for second quarter with orders for May delivery heavy. Zinc allotments to pipe mills are substantially larger. Light electric tubing supply is in excess of demand by a substantial margin. Strip steel for tubing is plentiful and considerable tonnage is offered by manufacturers producing for their own requirements. Prices are soft on excess supplies.

St. Louis—All types of pipe 3-in. and smaller continue scarce. Mills are booked through third quarter. Galvanized is in extremely short supply but producers believe increased allotments to small independents portend a boost in their zinc allocations soon. So far none has been forthcoming. Increased allotment of zinc could soon clear up the galvanized pipe scarcity. Demand for mechanical tubing is brisk.

San Francisco—Some distributors

2 ways to make crane operations pay more



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report a letup in demand for standard black pipe but there is little evidence of the same condition applying to galvanized. The lone producer in this area is booked up solidly for four months. Increased zinc supplies have not been felt. There is no evidence of price shading. Seamless tubing continues in critical supply.

San Francisco—Salt Lake Pipe Line Co., subsidiary of Standard Oil Co. of Calif., will construct a 330-mile 8-in. diameter oil products pipe line from Salt Lake City to Boise, Idaho, at a cost of $8 million. Completion is hoped for by late 1952.

Seattle—Supplies of mechanical tubing are insufficient for current demands. Improvement is expected in second quarter. The same is true of galvanized pipe. Some pipe distributors are forced to take part of their stocks in black pipe. Inventories are unbalanced. Cast iron pipe is more active with spring construction starting.

Fasteners . . .

Bolt, Nut, Rivet Prices, Page 139

New York—Bolt and nut demand is spotty. Inquiry for light fasteners for manufacturing assemblies is definitely off. Deliveries are within six to eight weeks, in some instances less. Specifications for structural bolts and nuts are sustained at the level of the past few weeks, with indications of improvement as the spring season gets further under way and as easing in government building restrictions takes hold. Deliveries on this type of material are running around eight to ten weeks. Specialties run well into August. Bolt and nut makers have no trouble getting wire stock but complain of continued difficulty in obtaining bars, especially the larger sizes.

Structural Shapes . . .

Structural Shape Prices, Page 135

New York—Structural bookings in February totaled 202,810 tons, off slightly from the 215,031 tons in January, according to the American Institute of Steel Construction. Two months total was 417,841 tons, 32 per cent less than the 618,119 tons booked in the 1951 period.

February shipments were 248,443 tons, slight increase over the January total of 242,723 tons, and somewhat improved over the 1951 monthly average.

The industry's backlog on Feb. 29 was 2,408,032 tons, drop of 8000 tons from the preceding month.

New York—Due to easing in governmental restrictions on building, inquiry is slightly more active and some work is going ahead that had been held up for months. An important instance is the 24-story office building at Madison avenue and 46th street, requiring about 5000 tons. Structural contract was placed months ago with the Harris Structural Steel Co., this city.

Boston—Bridge and power plants serve to offset the slack in private construction. Easing in building restrictions is releasing limited tonnage for estimates, including a gymnasium, Northeastern University, Boston. Groisser & Shlager, Inc., Somerville, Mass., is low on one superstructure section, 3950 tons, Fitzgerald expressway, Boston. Contracts include 2550 tons, power plant extension, North Weymouth, Mass. There is some easing in structural mill allotments, but wide flanged sections are in limited supply.

Low bid on fabricated carbon and silicon steel in place, super-structure section, Fitzgerald expressway, Boston, on resumption of bidding for that project was 20.85c per pound by Groisser & Shlager, Somerville, Mass. On silicon steel, quotations of other fabricators ranged up to 28.40c per pound.

Philadelphia—Fabricators' order backlogs are regaining substance because of somewhat better demand and government certification of various jobs that had been held up. This is reflected in tighter shape supply. The Navy will spend $8,500,000 on new facilities in this district, comprising $5 million for a Naval air station at Willow Grove, and $3,500,000 for a boiler and turbine testing laboratory.

Pittsburgh—Supply-demand situation is described as comfortable for the time being. Order books are filled for second quarter. With the recently authorized new construction of churches and other buildings by NPA, the mills see good business continuing into third quarter. All types and sizes of material are tight, but hardest to obtain are wide flange shapes. Carryover into third quarter will be substantial.

Seattle—Fabricators hold fair order backlogs but they are seeking business for third quarter. Washington state called for bids Apr. 22 for a Columbia river bridge at Pasco involving 2500 tons. A proposed hangar at Fairchild air field, calling for 2500 tons, is on planning boards. Structural supplies are easier, but some items, particularly wide flange beams, are difficult to obtain.

Columbia River Constructors, which is a combination of nine large western contracting companies, submitted joint low bid, $39,749,997, to U. S. Engineer, Seattle, for Chief Joseph powerhouse, cofferdam, substructures, intake units, access bridges, penstocks and other items. Government estimate was $42,775,610. Project involves 2400 tons of structurals, 16,500 tons of reinforcing bars and 2250 tons of steel piling and plates.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 135

Los Angeles—The spring flood of engineering construction projects is giving a brisk tone to reinforcing bar demand. Fabricators' prices for bars in place are depressed, but trade observers expect an upturn.

Seattle—Heavy tonnages of reinforcing steel are pending. Bids are in on 16,500 tons for the Chief Joseph dam. Other public works call for substantial quantities. Rolling mills are operating at capacity. Mills are accepting small jobs which fit into their schedules.

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Tin Plate . . .

Tin Plate Prices, Page 136

Pittsburgh—Tin plate prices will not be announced until the steel wage dispute is settled. Industry authorities think liberalization by NPA of some quota restrictions is on the horizon—although not imminent. They think order M-25 will be amended, though probably too late to give any relief in second quarter. May schedules look lighter than April's and at this time June appears to be no better than April. It is reported here NPA may issue additional CMP tickets for second quarter.

San Francisco—Pacific Can Co., which gets most of its tin plate from National Steel Corp., expects to have its supplies augmented by Kaiser Steel Corp., Fontana, Calif., when that company's new tin plate mill goes into operation later this year. Pacific Can is working on a machine to make 250 quart size cans a minute.

Iron Ore . . .

Iron Ore Prices, Page 141

Cleveland—Shipping is getting under way at lower lake ports for the 1952 navigation season. First cargoes of limestone will begin moving out of Calcite, Mich., within the next few days, weather and ice conditions permitting. Movement of ore from Lake Superior ports will be slower getting under way because of ice conditions on Lake Superior and the uncertainty attending the steel wage dispute. In excess of 90 million tons of ore are expected to be brought down the lakes this season.

Pig Iron . . .

Pig Iron Prices, Page 134

Cleveland—Although demand pressure on the merchant pig iron sellers is off, reflecting the slower pace of operations in the foundry industry, there still is no surplus iron in this area. The slack at smaller castings shops so far has been offset by increased requirements of the heavy foundries engaged on defense work. Threatened strike in the steel industry has not stimulated iron demand noticeably. Except for one idle Jones & Laughlin Steel Corp. stack, down for repairs, all local blast furnaces are in production.

Boston—At least two open-hearths in the area are down temporarily, reflecting the slump in demand for wire mill products. Foundry melt is below capacity. Inventories of most shops are not over 45 days. Blowing out of the Mystic blast furnace Mar. 24 for repairs is not expected to cause too much supply difficulty. The Everett furnace stocks will be spread thin among consumers over the six-weeks' shutdown, but NPA officials think it will be possible to divert to New England a certain amount of iron from furnaces at Buffalo, Erie, Cleveland and Birmingham without imperiling supplies of foundries in those areas.

New York—While threat of a steel strike is causing some pig iron consumers to lay in a little more tonnage, demand generally tends to the easy side. Gray iron foundries, particularly jobbing shops, are experiencing a continued lag in business. A number have reached the government limit on iron inventories.

Buffalo—Bethlehem Steel Co. lighted its new J stack at the Lackawanna plant last week. The furnace, costing approximately $1,250,000, is the largest in the world. Merchant iron trade shows little change with sellers disposing of all available tonnage despite the sharp reduction in operations at smaller foundries.

Philadelphia—Demand for basic pig iron exceeds supply, but foundry iron production is in better balance with requirements. A shipment of 1600 tons of Spanish iron recently arrived here for distribution among three foundries. Another smaller shipment is enroute.

Pittsburgh—Threatened steel strike has not increased demand for merchant pig iron. Demand is easy but an upturn is expected during the next 30 days from spring building programs. Defense casting business continues active. All blast furnaces in the area are in production with the exception of three stacks down for repairs.

Chicago—Pig iron supply and demand are close to normal balance. Premium iron, except for special analysis, is out of consideration. Consumers are expected to increase raw material inventories now that income tax liabilities are met.

St. Louis—Granite City Steel Co. on Mar. 23 blew in its No. 1 blast furnace which had been down two months for relining. Temporarily it will be on foundry iron to fill delayed orders.

Scrap . . .

Scrap Prices, Page 143

Pittsburgh—Brokers report incoming shipments have slowed down. Some consumers plan to keep buying scrap even if a steel strike becomes a reality. They would store the material in locations apart from their strike-bound plants. District plants are gradually building up inventories. Plants that were down to a half-day supply some time ago are now up to about a two-weeks stock. Cast scrap is a dead commodity here with no buyers.

Cleveland—Indications are the steel mills, as a general thing, will continue to take in scrap even though a strike closes plants in April. The threatened tieup has served to spur movement from dealers' yards. Mill stocks are somewhat improved over the recent past though still relatively low. With district steel operations at capacity pace, any letup in scrap receipts would immediately result in a reversal of the upward inventory trend in evidence for some weeks past. Good quality electric furnace grades are in demand. Cast grades continue sluggish.

Buffalo—Decided improvement is noted in the flow of scrap here. No immediate threat to steel operations now is seen with dealers rushing ship-

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ments on allocations orders. Clear weather is contributing to better movement of tonnage. The mills, however, are still pressing for stocks. Cast scrap is weaker with supplies increasing and demand lagging. Cast prices have slipped $1 to $2 per ton below ceilings.

Boston—More activity in cast scrap is likely to develop from reduced pig iron supply. Cast is weak with prices $3 under ceilings. Most foundries hold good inventories but are considering increasing scrap in charges. Slight improvement in steel scrap shipments is accompanied by improved grading.

Treble damages of $255,345 are sought by the Office of Price Stabilization in suits against eight Massachusetts steel scrap dealers and one broker. The suits allege improper application of water transportation charges instead of rail freight rates in determining ceiling prices.

New York—Increasing scrutiny of tonnage by OPS is resulting in extreme caution in consummating transactions, resulting in reduced flow of tonnage.

Philadelphia—Steel mill scrap stocks in some cases are down to less than a week's supply. This reflects increasing attention to specifications by buyers and sellers. Cast grades are in free supply.

Detroit—Slightly larger generation of scrap by automakers and lower consumption by some mills are making it possible to build stocks to fairly comfortable levels. Open-hearth material shows no signs of faltering pricewise.

Youngstown—The acute scrap shortage has eased its grip with arrival of spring. While still not plentiful, scrap is less scarce, and district steel mills are now more concerned over the threatened steel strike than with scrap supply. Yards report an easy market for cast. Steel scrap is coming in better from collectors, auto wreckers, and locomotive scrapping programs.

Chicago—Mills are expected to continue placing orders for steelmaking grades even if their plants are closed by a strike. This would make for inventory improvement when melting resumes. Strong demand prevails for open-hearth material. Specialties and cast grades are dragging.

St. Louis—Steel scrap prices, while quoted at ceiling, are softening through mills' tighter grading and reduced freight absorption. Improved shipments are increasing stockpiles gradually. Consumer requests for allocations are off. Cast scrap demand shows no signs of reviving.

Los Angeles—Collection of steelmaking scrap is 10 per cent higher than last year at this time. Undertone of the cast market is slightly stronger.

Seattle—Steel scrap is reaching tidewater in satisfactory volume. Cast scrap is a drug on the market. Increased auto scrapping and improved weather are contributing to a more promising supply outlook. The 20,000-ton steel transport *Republic*, purchased by Bethlehem for scrapping, left Puget Sound last week for Baltimore.

Warehouse . . .

Warehouse Prices, Page 141

Philadelphia—March business is disappointing to some warehouses. No difficulty is encountered disposing of bars, heavy plates and structurals, but light, flat-rolled products and certain specialties are sluggish.

Pittsburgh—Operators say that while receipts are near quota they wish they could acquire some of the excess tonnage seen in the market. Stocks are still unbalanced. Customer demand is firm but less hectic than a few months ago. No increased demand has been noted due to the steel strike threat.

Boston—Demand for steel from warehouse is off. With incoming shipments heavier, distributors are building inventories of some products, notably cold-rolled sheets, strip and light plates, one-inch and under. Stocks of carbon bars and structurals are unbalanced. In some cases consumers lack CMP tickets for cold-finished bars, notably larger sizes.

Cleveland—Threat of a steel strike, deadline for which has been postponed to Apr. 8, has stimulated demand on the warehouses slightly. Some of the improved demand, however, also is attributable to seasonal influences. Generally, warehouse stocks are improving steadily, but they still are unbalanced.

Chicago—Prospects of a steel strike after Apr. 8 are influencing warehouse sales. Consumers figure they can't lose by acquiring items needed to sustain operations over the near term.

Los Angeles—Order volume and inquiries are down sharply. Softening demand is spreading from cold-rolled sheets to other products.

San Francisco—Warehouse inventories have gained a little. Distributors report cold-finished bars under 2-in. easy; over 2-in., tight; mechanical tubing in largest sizes, critical; merchant pipe, buttweld, easier; galvanized products, not enough; plates, scarce; stainless and alloys, rough; hot rolled sheets, easier; small structural shapes, off; ship channels, scarce.

Seattle—Warehouse business picked up late in March due to opening of the fishing season, resumption of logging, and placements for Alaskan contracts. Volume this year is expected to equal that of 1951. Easing of government restrictions on building is reflected in stronger demand. Warehousemen in this area state increased supplies are not in evidence. Cold-rolled sheets are plentiful, but galvanized sheets are critically short. Plates are unobtainable.

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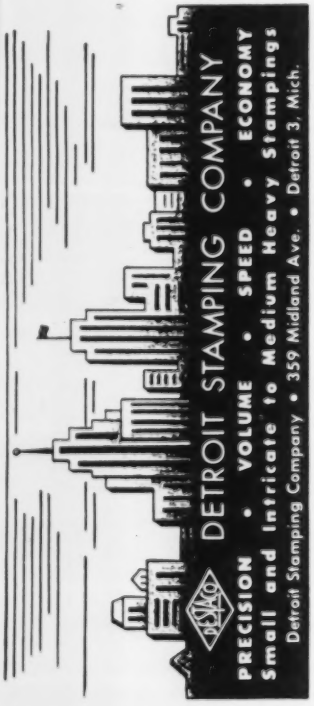
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STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

5000 tons, 24-story office building, Madison Ave. and 46th St., New York, work permitted to go ahead as a result of easing government regulations on building construction; contract let several months ago through Cauldwell-Wingate Co., general contractor, to Harris Structural Steel Co.

2350 tons, power plant extension, unit six, Boston Edison Co., North Weymouth, Mass., to American Bridge Co., Pittsburgh.

2500 tons, plant building, S. Morgan Smith Co., York, Pa., to American Bridge Co., Pittsburgh.

1450 tons, state bridgework, Dauphin county, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

540 tons, two Washington state bridges, Cowlitz county, to Poole, McGonigle & Dick, Portland, Oreg.

295 tons, housing project A-1-12, New Orleans, La., to Jones & Laughlin Steel Corp., Pittsburgh.

225 tons, addition, acid reclaiming plant, American Viscose Co., Nitro, W. Va., to Bethlehem Steel Co., Bethlehem, Pa.

190 tons, bridge for Hood River county, Oreg., to Gunderson Bros. Engineering Co., Portland, Oreg., low $71,370.

150 tons, mill addition, Crown-Zellerbach Co., West Linn, Oreg., to Pacific Car & Foundry Co., Seattle.

110 tons, state bridge, Schuylkill county, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

100 tons or more, tire cord plant, Goodyear Tire & Rubber Co., Cartersville, Ga., to Bethlehem Contracting Co., Bethlehem, Pa.; Wigton-Abbott Corp., Plainfield, N. J., general contractor; reinforcing steel to Southern General Fireproofing Co., Atlanta.

STRUCTURAL STEEL PENDING

4500 tons, Washington state Columbia river bridge, Pasco, bids to Olympia, Apr. 22.

4300 tons, superstructure, contract D2, Fitzgerald expressway, Boston, bids Apr. 15, Department of Public Works, state, Boston.

3950 tons, superstructure, contract C-2a, Fitzgerald expressway, Boston, Groisser & Shlager, Inc., Somerville, Mass., low, $1,603,817.

2500 tons, hangar, Fairchild, Washington, air field; plans on engineer's boards, Portland, Oreg.

2400 tons, Chief Joseph dam, bids in to U. S. Engineer, Seattle.

1280 tons, South Shore incinerator plant, Brooklyn, bids opened Mar. 26.

755 tons, state bridge, Lehigh county, Pa.; bids Apr. 25; also 505 tons of reinforcing steel and 4484 linear feet of steel piling.

700 tons, plant in Delaware for International Latex Corp., recently placed, then subsequently cancelled.

425 tons, Washington state bridge, Snohomish county, bids to Olympia, Apr. 22.

310 tons, bridges, Meshanticut traffic interchange, Cranston-Warwick, R. I.; M. A. Gammino Co., Providence, low, $1,891,726.65.

300 tons, structural work, Pennsylvania railroad, Morrisville, Pa.

200 tons, state highway bridge, Manchester-Wenham, Mass.; bids Apr. 1, Boston.

155 tons, state bridge, Swift river, Rumford-Mexico, Me.; bids Apr. 9, Augusta; also 2600 linear feet H-beam piles.

Unstated tonnage, Ontario section of New York state thruway, Onondaga county, bids Apr. 16; estimated cost is $5,849,000.

REINFORCING BARS . . .

REINFORCING BARS PLACED

2140 tons, housing project A-1-12, New Orleans, La., to Joseph H. Fox & Co., Birmingham, Ala.; R. P. Farnsworth & Co., New Orleans, general contractor.

200 tons, grain elevator, Dusty, Wash., to Northwest Steel Rolling Mills, Inc., Seattle.

REINFORCING BARS PENDING

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appurtenances, Columbia River Contractors Joint low bid, $39,749,997, to U. S. Engineer Seattle.

3500 tons, surface roads and approaches, Fitzgerald expressway, contracts D-1 and H-1, Boston; bids Apr. 8, State Department of Public Works, Boston.

5000 tons, Washington state bridge, Snohomish county; bids to Olympia, Apr. 22.

625 tons, Washington state bridge, Pasco; bids to Olympia, Apr. 22.

2500 tons, Washington state road projects; bids to Olympia, Apr. 8.

1500 tons, Washington state bridge, Snohomish county; bids to Olympia, Apr. 8.

1455 tons, state highway and bridge, Manchester-Wenham, Mass.; bids Apr. 1, Boston.

Unstated, approaches and connections, Granville St. bridge, Vancouver, B. C., $4½ million project; plans by City Engineer John Oliver.

Unstated 362-ft Oregon state bridge, Reedsport, general contract to Tom Lilleto, Reedsport, low $237,709.

Unstated, two 263-ft Oregon state bridges, Washington county; general contract to D. M. Drake Co., Portland, $164,320; same firm has 108-ft undercrossing, Washington county, low $44,960.

PLATES . . .

PLATES PLACED

1700 tons, gas holder, Harrisburg Gas Co., Steelton—Pa., to Bethlehem Steel Co., Bethlehem, Pa.

1000 tons, including shapes and other items, ventilating system, Mead, Wash., plant, Kaiser Chemical & Aluminum Co., to Puget Sound Sheet Metal Works, Seattle.

PLATES PENDING

18,000 tons, 25.5-mile, 52- to 66-in. Bull Run water supply line, Portland, Oreg., Kuckenberg Construction Co., Portland, low $4,975,675.

550 tons, estimated, 4,500,000-gallon steel ground storage reservoir, contract 52-1, reservoir No. 1, Miami Beach, Fla., Chicago Bridge & Iron Co., Chicago, low, $137,700.

150 tons, 750,000-gallon standpipe, Galena, Ill., Chicago Bridge & Iron Co., Chicago, low $32,800, alternate on 525,000-gallon standpipe, $26,500.

110 tons, 250,000-gallon elevated water tank and tower, Lauderdale-By-The-Sea, Fla., bids Apr. 7, town clerk.

100 tons, 20,000 barrel oil storage tank, city power plant; bids to Tacoma, Wash., Mar. 31.

Unstated, 825,000 gallon water storage reservoir; alternate bids also in, Ft. Lewis, Wash.; Valley Construction Co., Seattle, low on general bid.

PIPE . . .

CAST IRON PIPE PLACED

150 tons, 16-in. water mains for Seattle; to Pacific States Cast Iron Pipe Co., Provo, Utah.

200 tons, for Longview, Wash., reported placed with Pacific States Cast Iron Pipe Co., Provo, Utah.

CAST IRON PIPE PENDING

350 tons, 8- and 10-in. mains, Ft. Lewis, Wash.; Valley Construction Co., Seattle, low on general contract.

150 tons, replacement of 1740 feet of wood mains, Ft. Lewis, Wash. Bids to U. S. Army, Apr. 10; also accessories.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Orinoco Mining Co., nine 1600-hp 180-ton road switcher type diesel electric locomotives to the Baldwin-Lima-Hamilton Corp.; also one 250-ton diesel wrecking crane to Industrial Brownhoist Corp.

LOCOMOTIVES PENDING

Army Transportation Corps, Marietta, Pa., eight diesel-electric locomotives, bids Apr. 10.

Transportation Corps, nine standard gage diesel-electric locomotive units, bids Apr. 10; eight of the units will be 80 tons and one 120 tons, with six, including the 120-ton unit, for the Navy and the other three for the Marine Corps.

RAILROAD CARS PLACED

Grand Trunk Western, five coaches, to the Pullman-Standard Car Mfg. Co., Chicago.

Long Island, 20 single deck multiple unit passenger cars, to the Pullman-Standard Car Mfg. Co., Chicago.

Orinoco Mining Co., 560 gondola type, 100-ton ore cars and 66 miscellaneous cars to the Magor Car Export Corp. To be used for transporting iron ore in Venezuela.

Southern Railway, 3250 freight cars, 1750 hoppers, to American Car & Foundry Co., New York, and 1500 gondolas to the Pullman-Standard Car Mfg. Co., Chicago.

Union Pacific, 3700 freight cars, to own shops, for building next year.

Western Pacific, 100 seventy-ton mill type gondola cars, to the Greenville Steel Car Corp., Greenville, Pa.

RAILROAD CARS PENDING

Army Transportation Corps, Marietta, Pa., three hundred eighty six, 10,000-gal. tank cars for foreign service, bids closed Mar. 28.

Southern Railway, 250 ore cars, bids asked.

Transportation Corps, 204 eight-ton flat cars, and three-hundred-eighty-six 10,000-gallon petroleum tank cars, bids rejected in all cases but one because they contained an unlimited escalation clause; in the case of one because the price was considered too high. Equipment will come up for negotiation later.

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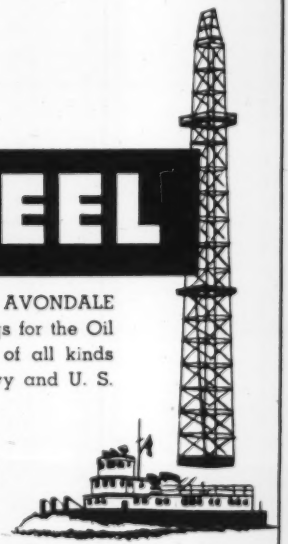

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Foundry Division (Service Foundry): New Orleans, La.

Metalworking Briefs . . .

CONSTRUCTION—ENTERPRISE—ORGANIZATIONAL CHANGES

Whitin To Make H & B Line

Whitin Machine Works acquired the textile machine manufacture and repair parts business of Howard & Bullough American Machine Co., Pawtucket, R. I. Whitin says it will make available to the textile industry repair parts and supplies for mills now having H & B equipment. The unfilled orders for repair parts currently on H & B books will be taken over and completed by Whitin.

H & B American Machine Co. stockholders voted to end the company's textile machinery business and sell all assets as a result of irregular business flow and high production costs fostered by antiquated plant facilities. William A. Sipprell Jr., president, emphasized that no dissolution of the company is planned and new fields are currently being considered.

Silver Creek Retooling

Silver Creek Precision Corp., Silver Creek, N. Y., has a $100,000 retooling program underway at its plant for production of jet engine components on subcontract from General Motors Corp.

Electroplaters' Office Moved

Executive offices of the American Electroplaters' Society moved to the American building, 445 Broad St., Newark 2, N. J. The editorial and business offices of *Plating*, society journal, are also at this address.

Remington Transfers Work

Production of metal tables was started at the Elmira, N. Y., plant of Remington Rand Inc. The work was transferred to Elmira from the plant at Marietta, O.

Perkins Buys Bendit Machine

Perkins Machine & Gear Co., West Springfield, Mass., purchased manufacturing rights of the Bendit metal forming machine from Kilham Engineering Inc., and is now handling national distribution of the machine.

A. O. Smith Corp. Expands

A. O. Smith Corp. will virtually double its production of glass-lined water heaters with a planned $600,000 expansion program at its Kankakee, Ill., works.

Canadian Oil For U. S.

Oil from Alberta, Canada, will flow to Pacific Coast states via a 700-mile pipeline over the Rocky mountains by 1954. The American Society of Mechanical Engineers learned from D. L. Roberts, vice president, Canadian Bechtel Ltd., Vancouver, that oil discoveries in the Province of Alberta have outstripped markets. The fields have a potential of more than 200,000 barrels per day.

Swartwout Names Agent

Swartwout Co., Cleveland, announces Mercator de Mexico, S. A., at Av. Insurgentes, 193 Mexico City 7, D. F., Mexico, as its sales and engineering representative for Mexico.

Graybar Named Distributor

Graybar Electric Co. Inc., New York, will distribute television broadcasting equipment manufactured by Federal Telecommunication Laboratories Inc., Nutley, N. J.

New Sterling Electric Branch

Sterling Electric Motors Inc., Los Angeles, opened a sales office in New Orleans to handle its electric power drives, says Alan J. Bronold, sales manager.

Ceco Buys Sterling Windows

Ceco Steel Products Corp., manufacturer of metal building products, purchased the business of Sterling Windows Inc., maker of aluminum windows, screens and storm windows.

Pittsburgh Launches Ship

The steamer, *Cason J. Callaway*, one of three new 647-foot ore carriers which will add 2.2 million tons a year to the capacity of U. S. Steel's Pittsburgh Steamship Division fleet was launched and is now being fitted at Detroit.

Koppers Drops Auto Rings

Koppers Co. Inc., Baltimore, will drop the manufacture of automotive piston rings and confine operations to the expanded manufacture of aircraft and industrial rings.

Lintern Corp. Moves

Lintern Corp. is moving to larger quarters at Painesville, O. Address: Box 428. The firm produces equipment used in the steel industry.

$5 Million Weber Contract

Weber Showcase & Fixture Co., and its subsidiary, Weber Aircraft Corp., both of Los Angeles, received a $5 million contract from Douglas Aircraft Co., Santa Monica, Calif., for production of doors for the C-124

Mystik Protecto-Mask

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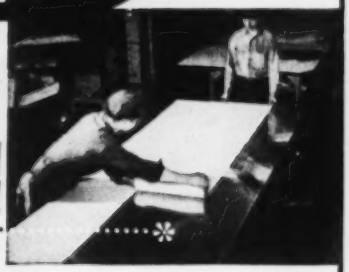

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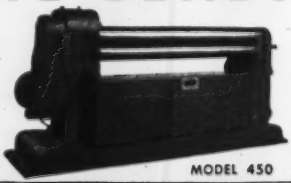

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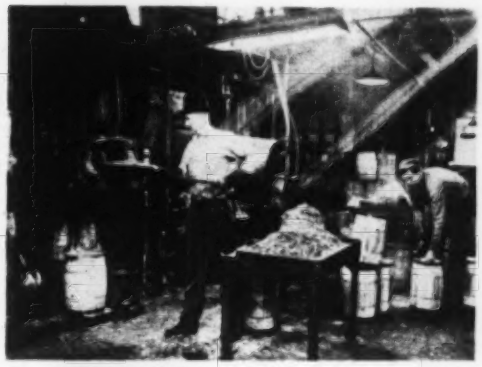

Firm Still Makes Nails on the Square

A workman charges the nail hardening furnace at Wheeling Steel Corp.'s LaBelle Works, the largest cut nail plant in the United States. During March, the firm celebrated its 100th year as a producer of four-sided, square-edged nails. Formerly made of wrought or puddled iron, they are now made of open-hearth steel

Globemaster transport and the complete engine assembly for AD-4 and AD-5 Skyraiders, carrier attack planes.

Kaiser Steel Expanding

Kaiser Steel Corp. plans an improvement program at its Sunnyside, Utah, coal mine which will increase production 60 per cent. The project is part of a $65 million expansion which will enlarge facilities for production of coal, iron ore, pig iron and steel.

New Atlantic Warehouse

Atlantic Steel Co. will construct a $500,000 building for its warehouse division at Northside drive and 14th street, Atlanta.

Bell Aircraft Buys Plant

Bell Aircraft Corp. will take over the former plant of the Niagara Wallpaper Co. at Niagara Falls, N. Y., and prepare it for the production of electronic, mechanical and electrical equipment for Bell guided missile projects.

New Quaker Rubber Branch

Quaker Rubber Corp., a division of H. K. Porter Co. Inc., Philadelphia, has established a branch warehouse and sales office in St. Louis, Mo. The new branch will supply industrial rubber products under J. H. Joyner as district sales manager.

Chevrolet Makes Plane Parts

Two Chevrolet Motor Division plants in Buffalo are starting to produce parts for use in the assembly of aviation engines at Chevrolet's Aviation Division plant in Buffalo, but will continue to make engines, gears and axles for automobiles.

Uddeholm Opens Branch

Uddeholm Co. of America Inc., New York, opened branch offices and warehouses at 5037 Anaheim-Telegraph Rd., Los Angeles, and 3756 Carnegie Ave., Cleveland, to distribute die and tool steels and cold rolled strip specialties.

Midwest Moves Office

Midwest Piping & Supply Co. Inc. moved its eastern division offices to 50 Church St., New York 7, N. Y., says E. A. Kerbey, executive vice president. Midwest manufactures welding fittings and does piping fabrication and contracting.

Toledo Pipe 50 Years Old

Toledo Pipe Threading Machine Co., Toledo, O., manufacturer of pipe threading tools and power pipe machines, is celebrating its fiftieth anniversary.

Union Carbide Expansion

Union Carbide & Carbon Corp.'s Electro Metallurgical Co. plans new facilities at its Marietta, O., plant for the production of 6000 tons a year of electrolytic manganese.

Handling Conference Plans

A second user-manufacturer conference sponsored by Material Handling Institute's Industry Service Committee is being planned for the latter part of May in either Detroit or Chicago on "Better Handling of Scrap." The conferences are conducted informally at the problem-solving level.

Hall's Safe Reorganized

Reorganization of Hall's Safe Co. Inc., direct successor of Hall's Safe Co. of Cincinnati, has been an-

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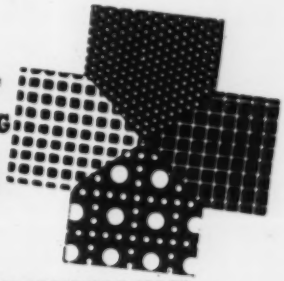

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nounced. The new firm will have offices at 808 Tenth St., N.E., Canton 5, O. Resident officers of the company are: Stanley L. Berkebile, vice president in charge of sales; and Glen F. Rittenburg, president and treasurer. Equipment handled includes safes, vaults and record files.

Interlake Iron To Expand

Interlake Iron Corp., Erie, Pa., will begin construction of an ore storage bin shortly as part of a multi-million dollar expansion program.

G. E. Converts Plant

General Electric Co. plans to convert its home dishwasher plant in Scranton, Pa., to the production of electronic tubes. The dishwasher facilities will be transferred to Louisville.

New Leitz Canada Plant

Ernst Leitz (Canada) Ltd. plans to erect a $200,000 factory building at Midland, Ont., for the production of precision instruments.

Donwill Names Distributor

Donwill Co., Portland, Oreg., will make initial nationwide distribution of its Industrial Monkey, hydraulically operated telescoping boom with a self-leveling cage for high work, through Mobilift fork lift truck sales and service branches.

Rheem Plant Nears Use

Rheem Mfg. Co.'s $1.5 million steel shipping container plant in Linden, N. J., is now nearly complete and installation of machinery and equipment has started.

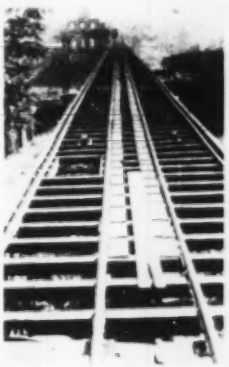
Steel Founders' Awards

National medal awards for outstanding leadership in the steel casting industry were announced by F. Kermit Donaldson, executive vice president of Steel Founders' Society of America at its fiftieth anniversary meeting.

Those named were: James Suttie, vice president, American Steel Foundries, Chicago, for the Lorenz Memorial Gold Medal; Luther A. Kleber, vice president in charge of manufacturing, General Steel Castings Corp., Granite City, Ill., for the Technical and Operating Gold Medal for 1951; Harold H. Johnson, chief metallurgist, National Malleable and Steel Castings Co., Sharon, Pa., for material published in the society's technical publication.

Procurement Office Opens

Western Air Procurement District of the Air Materiel Command opened a sub-regional contractors' relations office at 207 S. Main St., Salt Lake City, Utah, for direct bidding on contracts.



Scrap Drive on Incline

This two-car inclined railway, one of Pittsburgh's landmarks since 1872, is scheduled for the nation's scrap pile. Until the summer of 1951, it carried passengers between Mt. Oliver and Pittsburgh's south side. Most of the 300 tons of salvage is wrought iron

DuPont Plans Toxicology Lab

Construction of a $2 million Haskell Laboratory of Industrial Toxicology near Newark, Del., is planned by E. I. Du Pont de Nemours & Co. Research will be conducted on the causes of industrial fatigue and factors that make clothing comfortable as well as elimination of potential hazard to employees and customers in Du Pont products and manufacturing processes.

Globe-Union Canada Plant

Globe-Union Inc. will open a plant in Toronto named Globe-Union Canada Inc. which will manufacture electronic components to be marketed through the Globe-Union Centralab Div.

U. S. Steel Moves Office

United States Steel Co.'s Utah-Intermountain office is now located at 320 Kearns Bldg., Salt Lake City, Utah.

Modern Steel Leases

Modern Steel Treating Co. has leased a one-story building at 121st street and Peoria, Chicago.

Kennametal's Macro Builds

Macro, exploration division of Kennametal Inc., with main plant at Latrobe, Pa., will build an ore dressing and electric smelting works on Kingsway at Port Coquitlam, B. C. Tungsten ores and concentrates will be obtained from sources in British Columbia while scheelite, hubnerite and wolframite ores and concentrates will be purchased for refining into tungsten carbide.

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LeBlond 21" x 10' bed, 3 SCD, 5'2" centers.
Gould & Eberhardt 16" Back Geared Shaper.
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Gould & Eberhardt 28" Shaper, gear box.
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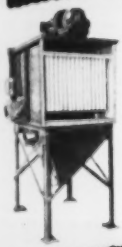

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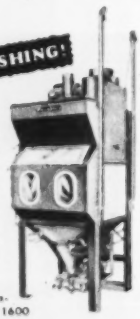

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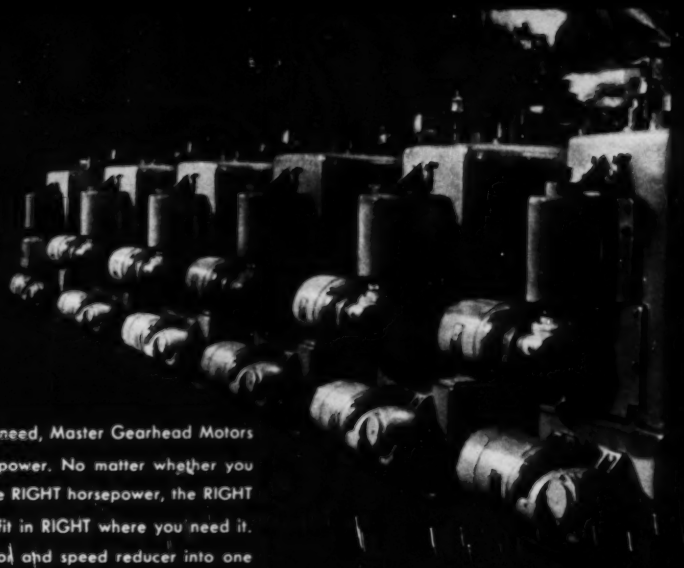

No matter what size power units you need, Master Gearhead Motors are the horsesense way to use horsepower. No matter whether you use big ones or little ones, you get the RIGHT horsepower, the RIGHT shaft speed in a single unit that will fit in RIGHT where you need it. The integral construction of both motor and speed reducer into one compact unit, permits many parts to be stripped away from both the power drive and the completed machine, and pays off handsomely in savings in material . . . savings in space. In big sizes or small sizes, you'll find them easy to order, easy to use . . . a great help in securing compact, clean-cut, economical designs for your equipment.

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Increase the salability of your motor driven products . . . improve the economy, safety and productivity of your plant equipment . . . with Master Gearhead Motors, the horsesense way to use horsepower.

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BIG ones or little ones

MASTER GEARMOTORS

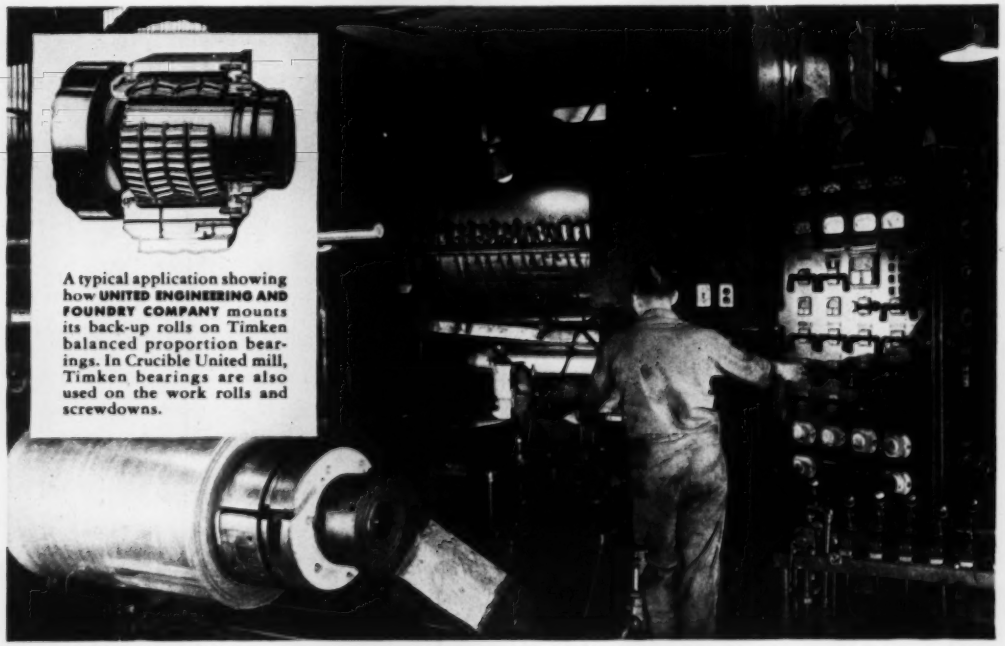
How TIMKEN® bearings back up a back-up roll

THIS United 54" four-high reversing mill is rolling 38½" wide sheet type 302 stainless steel at Crucible Steel Company's Midland, Pa., plant. To help it stay on the job day after day—with a minimum time-out for maintenance and repair—its back-up rolls are mounted on Timken® balanced proportion bearings. Timken balanced proportion bearings on the back-up rolls provide greater mill rigidity because they permit larger diameter roll necks than standard roller bearings. Load ratings are increased up to 40%, roll neck strength upped 50 to 60%.

Timken bearings on work rolls and back-up rolls eliminate complicated lubrication systems, permit the use of simple and economical grease lubrication. Rolls can be changed quickly and easily. No special thrust bearings are needed because Timken bearings take radial and thrust loads in any combination. And due to their true-rolling motion, and incredibly smooth surface finish, Timken bearings reduce roll neck friction. Smoother starts and stops of mills on Timken bearings prevent the loss of steel.

Over 50 years of bearing research and development have made Timken bearings first choice throughout industry. Specify them for roll necks on new and existing equipment. For full information consult our roll neck bearing specialists. Write The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ont. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



A typical application showing how UNITED ENGINEERING AND FOUNDRY COMPANY mounts its back-up rolls on Timken balanced proportion bearings. In Crucible United mill, Timken bearings are also used on the work rolls and screwdowns.

FINISHED TO CLOSER TOLERANCES

Finishing to incredible smoothness accounts for much of the precise, smooth rolling performance of Timken bearings. This honing operation is typical of the amazingly accurate manufacturing methods at the Timken Company.

The Timken Company is the acknowledged leader in: 1. advanced design; 2. precision manufacturing; 3. rigid quality control; 4. special analysis steels.

TIMKEN

TRADE MARK REG. U.S. PAT. OFF.

TAPERED ROLLER BEARINGS

NOT JUST A BALL NOT JUST A ROLLER THE TIMKEN TAPERED ROLLER BEARING TAKES RADIAL AND THRUST LOADS OR ANY COMBINATION